

BOSTON PUBLIC LIBRARY



3 9999 06541 531 5

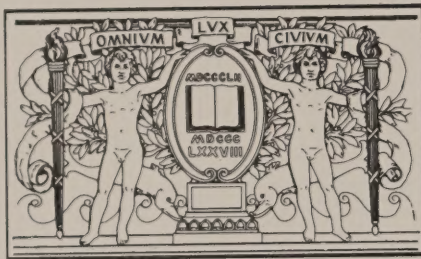
DOV DOC

Δ

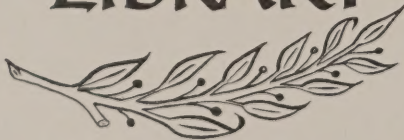
M3

MAPC

70/1



**BOSTON
PUBLIC
LIBRARY**



3
APC
10/1

I 762 GOVT. DOC.

**INTERAGENCY COMMITTEE REPORT ON THE
BOSTON METROPOLITAN AIRPORT SYSTEM
1970 - 1990
JUNE 1970**

Boston Public Library

TECHNICAL ADVISORY COMMITTEE
ON THE
BOSTON METROPOLITAN AIRPORT SYSTEM STUDY

Robert G. Davidson, Chairman
Executive Director
Metropolitan Area Planning Council

Richard E. Kennedy
Director of Aviation
Massachusetts Port Authority

Harold E. Hughes
Bureau of Transportation Planning
Massachusetts Department of Transportation

Crocker Law
Director
Massachusetts Department of Transportation

Walter Harrington
Director of Area Planning
Massachusetts Department of Commerce and Development

Walter B. Williams
Planning and Development Department
Massachusetts Bay Transportation Authority

William Brown
Airports Branch
Boston Area Office
Federal Aviation Administration
U.S. Department of Transportation

Paul E. Schmitt, Secretary
Director for Metropolitan Region

INTERAGENCY COMMITTEE REPORT ON THE
BOSTON METROPOLITAN AIRPORT SYSTEM

1970 - 1990

June 1970

Boston Public Library

The preparation of this report was financially aided through a Federal grant from the Department of Housing and Urban Development under the Urban Planning Assistance Program authorized by Section 701 of the Housing Act of 1954, as amended.

June, 1970

This document was prepared by Mr. Richard E. Kennedy as
Executive Director on April 1, 1970.

Gov Doc
Plate only

INTERAGENCY COMMITTEE REPORT ON THE
BOSTON METEOROLOGICAL ALARM SYSTEM

1930 - 1933

June 1930

Boston Public Library

The preparation of this report was financially
aided through a Federal grant from the Depart-
ment of Housing and Urban Development under the
Urban Planning Assistance Program authorized by
Section 501 of the Housing Act of 1934, as amended.

June, 1933

TECHNICAL ADVISORY COMMITTEE
to the
BOSTON METROPOLITAN AIRPORT SYSTEM STUDY

Robert G. Davidson, Chairman
Executive Director*
Metropolitan Area Planning Council

Richard E. Mooney
Director of Aviation
Massachusetts Port Authority

Maxwell Kaplovitz
Bureau of Transportation Planning
Massachusetts Department of Public Works

Crocker Snow
Director
Massachusetts Aeronautics Commission

Regis Harrington
Director of Area Planning
Massachusetts Department of Commerce and Development

Walworth B. Williams
Planning and Development Department
Massachusetts Bay Transportation Authority

William Cronan
Airports Branch
Boston Area Office
Federal Aviation Administration
U.S. Department of Transportation

Paul E. McBride, Secretary
Director for Metropolitan Programs
Metropolitan Area Planning Council
and
Project Director
Metropolitan Airport System Study

*Mr. Davidson was succeeded by Mr. Richard M. Doherty as
Executive Director on April 1, 1970.

TABLE OF CONTENTS

<u>ITEM</u>	<u>PAGE</u>
Summary	i
Chapter I - Background	1
Chapter II - Second Airport Question	21
Chapter III - Second Airport Location	55
Chapter IV - Supplementary Airport System	101
Chapter V - Organizational Program	109
Chapter VI - Financial Program	123
Separate Statement by MAPC	141
Separate Statement by MPA*	144
Separate Statement by DPW	147
Separate Statement by MAC	148
Separate Statement by FAA	151
Appendix A - Highway Costs	152
Appendix B - Consultant Market Analysis	154
Interagency Agreement	163

Boston Metropolitan Airport System Report

SUMMARY

Jet powered fixed wing air carrier operations serving eastern Massachusetts are expected to continue to increase during the 1970's and 1980's. Large disparities in air traffic projections, uncertainties in the amount of growth of the national economy, and, real questions about the eventual usefulness of high speed ground transportation and short and vertical take-off and landing aircraft foreclose a pure scientific analysis or set of recommendations. The Committee is convinced, however, that even the most conservative forecast of aircraft operations would exceed the present capacity of Boston Logan Airport.

The majority of the improvements contemplated under the proposed Logan Airport expansion program, as outlined in the report, can be accomplished under authority currently held by the Massachusetts Port Authority within existing airport boundaries. However, for those portions of the expansion program for which added authority is needed, an early high level policy decision should be made by the Governor and Legislature.

Even though the decision be to permit the entire Logan Airport Expansion Program proposed, there is still a possibility that a second major Air Carrier Airport would become necessary by 1990, or at some period thereafter. If the decision is to limit extension of the Port Authority's authorized development rights, then there is a much stronger probability of a critical and more immediate requirement for a second major air carrier airport.

A majority of the Technical Committee has concluded that the Logan Airport Expansion Program should be undertaken and completed by the Massachusetts Port Authority. A majority of Technical Committee members agree that the total Logan Airport Expansion Program, plus the development of a supplemental airport system, would serve as a probable alternative means of meeting the anticipated growth of both Air Carrier and General Aviation operations within the eastern Massachusetts region during the forecast period to 1990.

The Technical Committee is in unanimous agreement, irrespective of the ultimate fate of the Logan Airport Expansion Program, that the Commonwealth of Massachusetts should now

take steps to reserve an appropriate site within eastern Massachusetts for possible use as a second major Air Carrier Airport.

The majority of the Technical Committee recommends that no further consideration should be given to the possible location of a major Air Carrier Airport in the Dover area, the Sharon-Easton area, or the Uxbridge area.

The majority of the Technical Committee recommends that additional detailed study, and careful consideration be given to the possible location of a major Air Carrier Airport in the Hopkinton area, the Plymouth area, and the Otis Air Force Base area.

It is further recommended that the Governor, with the approval of the General Court, appoint a special Airport Site Selection Commission for the purpose of conducting a final one-year detailed evaluation of alternative sites, of establishing the identification of a selected specific site, and, finally, of recommending preservation (including such land acquisition as may be necessary and desirable) of the selected site for possible ultimate use as a second major Air Carrier Airport.

The Technical Committee recommends that the selected site be acquired by an appropriate state agency, and, through proper legislation, be made available to the Massachusetts Port Authority for development. The initial cost of a second Air Carrier airport will total as much as 300 million dollars and perhaps more. The Technical Committee expects that a greater proportion of Federal aid will become available through the recently enacted airport-airways federal aid legislation. It is anticipated that the selected second airport site would be initially developed as a General Aviation type Supplementary Airport by the Massachusetts Port Authority if sufficient federal aid and Port Authority revenue resources were available and would ultimately be developed in stages to a major Air Carrier Airport facility as the future demand justified such development.

The Technical Committee recommends the development of an expanded supplementary airport system to accommodate general aviation growth. The majority of the Committee recommends a system consisting of expansion of seven existing airports and

development of four new supplementary airports, as follows:

Bedford	- expanded
Weymouth	- expanded
Beverly	- expanded
Norwood	- expanded
Marshfield	- expanded
Marlborough area	- new airport
Hopkinton area	- new airport
Lawrence	- expanded
Mansfield	- expanded
Newburyport area	- new airport
Lowell area	- new airport

The development of the Supplemental Airport Systems requires new incentives, additional resources and an improved administrative program. The Massachusetts Aeronautics Commission should be assigned the responsibility of providing within a one year period a specific program of supplemental airport improvement projects that are to be carried out by the individual communities - or by the state if the communities so desire.

Financing the supplemental airport system must be geared to expected federal aid. A 20-year financial program amounting to 48 million dollars is considered necessary for this purpose.

Separate statements by individual committee members relative to the findings and recommendations contained in this Report have been incorporated at the conclusion of Chapter VI of the Report.

CHAPTER I

BACKGROUND

Need for Study

During the post war period, 1948-1968, the commercial airline industry experienced unprecedented national and international growth in terms of passengers carried, cargo handled, and number of aircraft operations performed.

Exhibit 1 on the next page shows the twenty year history of Domestic Commercial airline growth in terms of aircraft departures, enplaned passengers, and tons of cargo originated.

At the same time, the non-certificated airline segment of aviation, usually called General Aviation, also experienced phenomenal national growth in number of aircraft operations generated.

Aircraft operations at Boston Logan Airport have increased significantly during the past decade, particularly during the past five year period as shown in Exhibit 2.

The Aviation Industry and the Federal Aviation Administration (FAA) of the United States Department of Transportation (DOT) have both projected continued large-scale growth for commercial and general aviation activities. Such forecasts of substantial growth in aviation activities required that the Boston metropolitan area take steps to prepare to accommodate future aviation demand for improved and additional facilities to serve the metro-

EXHIBIT 1

Total U.S. Domestic Fixed Wing Air Carrier Traffic

<u>Calendar Year</u>	<u>Aircraft Departures</u>	<u>Enplaned Passengers</u>	<u>Tons of Cargo Originated</u>
1948	1,861,199	13,060,372	156,365.9
1949	2,023,702	14,732,687	211,471.7
1950	2,137,294	16,937,018	289,490.6
1951	2,319,143	21,895,612	286,836.4
1952	2,431,633	24,350,307	296,468.5
1953	2,612,767	28,004,269	316,580.2
1954	2,660,579	31,657,852	310,894.3
1955	2,901,758	37,226,432	389,307.9
1956	3,094,075	40,752,563	442,517.1
1957	3,318,282	44,017,548	434,788.4
1958	3,176,102	43,568,139	431,562.3
1959	3,420,682	49,357,870	501,713.6
1960	3,343,989	50,584,135	510,492.5
1961	3,248,467	55,011,493	553,465.2
1962	3,198,169	58,911,587	646,663.1
1963	3,317,967	67,318,615	701,990.3
1964	3,417,601	76,657,102	863,811.4
1965	3,634,737	89,123,088	1,080,239.3
1966	3,773,678	102,186,549	1,242,338.6
1967	4,296,153	123,624,098	1,337,894.9
1968	4,606,354	140,935,857	1,588,325.1

Source: Airport Activity Statistics for Certificated Route Carriers, Civil Aeronautics Board and Federal Aviation Administration

EXHIBIT 2

BOSTON LOGAN AIRPORT
ANNUAL AIRCRAFT OPERATIONS
(1957-1969)

<u>Calendar Year</u>	<u>Airline Operations</u>	<u>Growth Index</u>	<u>Total Operations</u>	<u>Growth Index</u>
1957	114,176	99.9	209,545	102.4
1958	109,994	96.3	202,604	99.0
1959	118,625	103.8	201,917	98.6
1960	119,593	104.7	194,299	94.9
1961	121,191	106.1	185,112	90.4
1962	129,033	112.9	198,552	97.0
1963	143,620	125.7	219,708	107.3
1964	153,154	134.0	234,205	114.4
1965	150,452	131.7	236,498	115.5
1966	158,598	138.8	251,804	123.0
1967	186,491	163.2	279,001	136.3
1968	207,758	181.8	312,301	152.5
1969	216,849	190.0	319,960	156.3

INDEX (1957-1959 = 100)

SOURCE: Federal Aviation Adminis-
tration, Air Traffic
Activity Reports

politan area.

Aside from the anticipated expansion of aircraft numbers and operations, new aircraft technology has, in the past, resulted in serious environmental problems arising from generation of noise and fumes, and may, in the future, create additional environmental problems, which problems require full consideration in the development of future metropolitan airport facility planning.

Interagency Cooperation

In mid 1965, the Metropolitan Area Planning Council (MAPC) initiated a series of discussions with other appropriate Federal and state agencies relative to a proposal to undertake a Boston Metropolitan Airport System Study on a comprehensive and coordinated basis in order to identify the future airport facility needs of the area. These agencies were the Massachusetts Port Authority (MPA), the Massachusetts Aeronautics Commission (MAC), the Massachusetts Department of Public Works (DPW), the Massachusetts Department of Commerce and Development (DCD), the Federal Aviation Administration (FAA), and the U. S. Department of Housing and Urban Development (HUD).

The MAPC commenced these discussions in conformance with its previous initiation of, and participation in, comprehensive planning studies of land use, transportation, open space and recreation and other regional community facilities programs.

The Council, in fostering the Airport System Study, sought to comply with the legislative mandate contained in Section 110 of Chapter 668 of the Acts of 1963 which created the MAPC as the official regional planning agency for the Boston metropolitan area. Section 110 reads, in part, as follows:

"The Council shall conduct such research and compile such data, maps, charts and tables as may be helpful or necessary to improve the physical, social and economic conditions of the district, and shall prepare and revise comprehensive plans for the physical, social and economic improvement of the district, or parts thereof, with respect to the optimum use of the land areas in the district, and the most efficient provisions for the utilities serving these land areas."

At the national level, the Federal Aviation Administration and predecessor agencies have been responsible for the development, and annual revision, of a National Airport Plan in accordance with the Federal Airport Act of 1946.

At the state level, the Massachusetts Aeronautics Commission is responsible for the development of a State Airport Plan in conformance with Section 39A of Chapter 90 of the General Laws of the Commonwealth of Massachusetts. Section 39A states, in part:

"The Commission shall prepare and revise from time to time a plan for the development of airports and air navigation facilities in the commonwealth. Such plan shall specify, in terms of general location and type of development, the projects considered by the commission to be necessary to provide a system of airports adequate to anticipate and meet the needs of civil aeronautics within the commonwealth."

Also at the state level, the Massachusetts Department of Public Works has been designated as the principal source of transportation planning within the Commonwealth of Massachusetts by virtue of Section 3A of Chapter 16 of the General Laws, which reads as follows:

"There shall be in the department a bureau of transportation planning and development which shall be under the supervision and control of the commission. With the approval of the governor, the (Public Works) commission shall appoint, and with like approval may remove, an officer to be known as the director of transportation planning and development, who shall be the executive and administrative head of the bureau. He shall be a person with professional skill and experience in the field of transportation planning and shall not be subject to chapter thirty-one or to section nine A of chapter thirty.

Said bureau shall serve as the principal source of transportation planning in the commonwealth, and in so serving shall conduct research, surveys, demonstration projects and studies in co-operation with the federal government, other governmental agencies, and appropriate private organizations and be responsible for the continual preparation of comprehensive and co-ordinated transportation plans and programs for submission to and adoption by the commission and for such review or consideration by other governmental agencies as may be required by law or deemed appropriate by the commission. Said plans and programs shall be prepared in co-ordination with comprehensive urban development plans and co-operation with the said other agencies so far as practicable."

Finally, at the state level, the Massachusetts Department of Commerce and Development, under Section 2(b) of Chapter 23A of the General Laws, was created to serve as the principal

agency of the government of the Commonwealth for the following (among others) purpose:

"Preparing and perfecting, and assisting in the preparation and revision of, plans for the physical, social and economic development of the Commonwealth, and by means of study, advice and consultation, co-ordinating any activities of public and private agencies affecting such plans."

At the metropolitan level, the Massachusetts Port Authority has been charged with the operation and development of the major commercial airport serving the Boston metropolitan area, Boston-Logan International Airport, and, under Section 3 of Chapter 465 of the Acts of 1956, is authorized and empowered:

"to investigate the necessity for additional facilities for the development and improvement of commerce in the city and in the metropolitan area surrounding the city and for the more expeditious handling of such commerce, including but not limited to, additional traffic facilities, bus and truck terminals, off-street parking facilities, and facilities for handling, storage, loading or unloading of freight or passengers at steamship railroad or motor terminals or airports, and to make such studies, surveys and estimates as may be necessary to determine the feasibility of any such facility."

HUD Study Grant Application

In discussion with the professional staff of the Port Authority, it was established that the Authority had been also considering the initiation of a metropolitan airport system study for some time. The Council staff agreed that such a study had become necessary and the Council urged that such

a study effort should be undertaken on a cooperative basis with the appropriate state and federal planning agencies.

The Council staff informed all of the other affected agencies that it would seek federal financial assistance for the metropolitan airport system study from the U.S. Department of Housing and Urban Development under the Urban Planning Assistance Program authorized by Section 701 of the Housing Act of 1954. Such a planning grant would provide two-thirds of the cost of the study with the remaining one-third share to be provided from local agency funds and staff time contributions.

As a result of such discussions, the Massachusetts Port Authority and the Massachusetts Department of Public Works agreed to join the Council in providing the local agency one-third share of the cost of the study.

The Council submitted a formal application to the Department of Housing and Urban Development for a Section 701 planning grant for the airport study on June 30, 1966.

Interagency Agreement

The Council, the Port Authority and the Public Works Department signed an interagency agreement on October 6, 1966, committing these three agencies to participate in the airport system study through the contribution of funds, data and staff resources. A copy of the signed Interagency Agreement

was submitted to HUD in support of the Council application for federal aid. A copy of the Interagency Agreement is appended to this Report.

The Interagency Agreement provided that the Port Authority would undertake the preparation of a study of the future aviation potentials and facility requirements for the Boston metropolitan area with the assistance of such Consultant firm or firms as would be approved by the Executive Director of the Council in order for the study cost to be eligible for federal aid.

Study Grant Approval

On March 16, 1967, the Department of Housing and Urban Development notified the Council that the Metropolitan Area Planning Council application for the airport system study grant had been approved in an amount of \$95,591. This federal grant required a local contribution of \$48,000 in funds and staff resources with the Port Authority contribution, for the purposes of the HUD grant, set at \$38,000, the Council contribution at \$5,000 and the Department of Public Works contribution at \$5,000.

Port Authority Consultant

Prior to the notification by HUD that the federal grant had been approved, the Port Authority had engaged on February 9, 1967 the firm of Landrum and Brown of Cincinnati, Ohio, a nationally recognized firm of airport consultants, to undertake a metropolitan airport system study at an estimated cost of

\$90,000.

Associated with Landrum and Brown in this study effort was the Consultant firm of Airborne Instruments Laboratory of Melville, New York. Airborne Instruments Laboratory is a nationally known firm in the specialized field of air traffic control, airspace use and airport capacity.

The Port Authority had taken the initiative in authorizing the start of the study before the federal grant was approved because of an unforeseen delay between the time the Council applied for the grant on June 30, 1966 and the date of the approval of the grant by HUD on March 16, 1967.

Technical Committee Creation

Immediately upon notification of the Airport System study grant approval by HUD, the Council invited representatives of other appropriate public agencies to join in the formation of a Technical Advisory Committee as proposed in the Interagency Agreement.

The Technical Committee was comprised of the six public agencies which possessed statutory responsibilities at the national, state, and metropolitan levels for airport planning and regional land use (FAA, MAC, DPW, DCD, MPA, and MAPC).

Subsequently the Technical Committee invited the Massachusetts Bay Transportation Authority (MBTA) to join in Technical Committee deliberations in view of the possible

relationship between airport system planning and mass transportation development.

Technical Committee Meetings

The first meeting of the Technical Advisory Committee to the Metropolitan Airport System Study was held on April 28, 1967 in the offices of the Council.

At this meeting, the Port Authority was informed that the consultant and MPA staff expenditures incurred in the airport system study prior to March 16, 1967 would not be eligible for reimbursement under the federal planning grant and that the consultant activities would not be eligible for federal reimbursement unless the selection of the Consultant firm engaged by the Authority was approved by the Executive Director of the Council.

The Executive Director subsequently informed the Committee that he had approved the selection of the Consultant firms previously engaged by the Authority and that the MPA expenditures for the Consultant's activities subsequent to March 16, 1967 would be eligible for two-thirds federal reimbursement within the total limitation established in the approved federal grant.

On July 18, 1967, the Committee met with the Port Authority Consultant and was briefed on the methodology to be used by the Consultant to identify the character and extent of future air transportation demand within the Boston metropolitan area.

During the next several months, the Consultant team in-

vestigated the metropolitan area potential air traffic demand, the capacity of the existing airport system, the need for additional capacity, and the identification of how such additional capacity could be satisfied. These investigations were undertaken with the assistance of an extensive computer program.

On February 14, 1968, the Airport Study Director met with the Port Authority Technical Committee representative and Port Authority Consultant in Cincinnati, Ohio for a briefing session. As a result of this briefing session, the Study Director requested the Port Authority representative to instruct the Consultant to submit a preliminary draft of various sections of a Report. In March such a preliminary draft was made available to the Study Director. Upon review of the Preliminary Report Draft, the Study Director requested that additional information be prepared by the Consultant so that the basic assumptions and methodology employed by the Consultant might be clearly understood by the Technical Committee. Such additional information was subsequently provided by the Consultant.

On June 14, 1968, the Technical Committee met for the purpose of hearing the presentation of preliminary findings and recommendations by the Consultant team.

Various members of the Technical Committee initially reacted to the findings and recommendations of the Consultant, as presented at this meeting, as "not adequately demonstrated"

and "unreasonable and unrealistic."

The Technical Committee next met on August 16, 1968 to review the findings and recommendations of the Consultant's Report. The Committee agreed that, while the Report recommendations might not be "reasonable and realistic," the Report did represent a most valuable input for the effort to identify and satisfy the airport requirements for the Boston metropolitan area and the Eastern Massachusetts region.

Consultant Report Findings and Recommendations

In general, the Consultant Team first conducted an inventory of existing airline airport (Logan) and existing non airline airport facilities within the Boston metropolitan area.

An extensive analysis of the economic characteristics of the Boston region was undertaken by the Consultant, which was utilized to produce aircraft operation forecasts for the area. These forecasts represent future airport facility demand for various types of aviation uses namely, certificated airline aircraft operations, military aircraft operations, and general aviation aircraft operations. These forecasts were stated as in terms of future annual aircraft operations for the years 1970, 1975, 1980, 1985, and for the final forecast year 1990.

The Consultant then compared the forecast for future aircraft operations demand to the existing metropolitan airport system, and where existing airports were found to possess in-

adequate capacity, the consultant investigated what reasonable steps could be taken to expand existing airport capacity to meet future demand.

Where expansion of existing airports could not be expected to meet future demand, new additional airport sites were recommended to meet demand.

The Consultant recommended new airport sites under the general criteria of maximum access to users, minimization of air traffic conflicts with other airports, reasonable cost for development and operation and minimum adverse impact upon surrounding land uses.

Specifically, the Consultant Report contains the following basic findings and recommendations:

1. Metropolitan Boston requires a second major commercial airport during the forecast period 1970 through 1990.
2. A second major commercial airport should be immediately located in the Dover area.
3. Boston Logan Airport should be expanded to reach its reasonable maximum capacity during the forecast period.
4. There is a need for expansion of existing General Aviation Airports and creation of new General Aviation Airports.
5. A system of General Aviation Airports should be developed during the forecast period to include the following airport sites for the following types of aviation service:

Instrumented Airports

Beverly Airport (existing)
Hanscom Airport (existing)
Hingham Airport (new)

Non-Instrumented Airports

Reading Airport (new)
Weston Airport (new)
Norwood Airport (existing)
Weymouth Airport (existing)

6. Two special Vertical and Short Take Off and Landing Airport (V/STOL) sites should be located in the City of Newton and the City of Medford during the forecast period.

The Consultant Report entitled: A Study of the Air Transportation Potential and Facility Requirements in the Boston Metropolitan Air Service Area, dated September, 1968, together with a lengthy appendix to the Report, is to be considered as an integral part of this Committee report in terms of a Technical resource supplement.

Release of Consultant's Report

Subsequent to the August 16, 1968 Technical Committee meeting, the Executive Director of the Massachusetts Port Authority, with the concurrence of the Executive Director of the Metropolitan Area Planning Council, authorized the public release of the consultant's Report at a formal press conference held on August 30, 1968. At the press conference, the Port Authority and Planning Council Executive Directors emphasized that the Consultant's Report recommendations were not the final recommendations of the public agencies which composed the Study Technical Committee. The Port Authority and Council Executive Directors stated the Technical Committee would continue to meet in order to examine each recommendation and element of the Con-

sultant's Report in detail, to gather additional pertinent data as might be required, and finally, to prepare a joint recommendation for a program which meets the needs of future air transportation demands for the Boston metropolitan area.

Technical Committee Review

Several additional Technical Committee meetings were held in latter 1968 and early 1969. These meetings consisted of discussions regarding the Consultant Report air traffic forecast assumptions and methodology, the potential of new technological development in the aviation industry, and alternative regional airport development programs to meet the aviation demands of the future.

Massachusetts Aeronautics Commission Proposals

During the course of Technical Committee deliberations during the latter part of 1968, the Director of the Massachusetts Aeronautics Commission (MAC) presented his views relative to the future airport requirements of the eastern Massachusetts region. The MAC Director's position is detailed in the Airport Plan, dated January, 1969, prepared by the Commission.

In summary, the Airport Plan states as follows:

"The MPA (Port Authority) is providing a portion of the Boston metropolitan area need with the Boston-Logan and Bedford airports. The Beverly and Norwood airports also contribute substantially to this need, as will the South Weymouth Naval Air Station when it becomes available for civil or joint civil/military use.

To the extent that Route 495 becomes integrated with Boston's transportation economy, the Lawrence and Mansfield airports, and those planned for the Newburyport, Lowell, Marlboro and Hopedale areas will also serve Greater Boston needs.

It is possible that a second major air terminal comparable to the Boston-Logan Airport will become necessary. Otis Air Force Base (Cape Cod) seems to be the most practical choice for this (second airport)."

The MAC Director emphasized that the Massachusetts Aeronautics Commission state Airport Plan was substantially different from the Consultant Report recommendations relative to the possible location of a second major commercial airport to serve the eastern Massachusetts region. The Commission Director also strongly pointed out that MAC plan contained major differences when compared to the Consultant Report as to the number, location and type of general aviation airports recommended for this region of the state.

Department of Public Works Report

In January, 1969, the Bureau of Transportation Planning and Development of the Massachusetts Department of Public Works (DPW) published a Report entitled: Airports and Air Transportation in Eastern Massachusetts.

Under the section of Recommendations, The Report stated, in part, as follows:

"It (Boston Logan Airport) has already reached a point at which its capacity is being tested in aircraft operations and vehicular access. Additions and modifica-

tions to its field and passenger service plant will not be sufficient to meet the estimates of future demand."

"The search and selection of a 20,000 acre location (should be) so sited that there is complete freedom of air space conflict and with existing clear runway threshold protection. This location for a major air carrier jet port should be 30 to 50 miles from Logan and on the perimeter of the 1990 metropolitan region."

It is to be noted that the MPA Consultant Report Dover Airport recommendation envisioned a 10,000 acre airport site to be located less than 20 miles from Logan Airport.

Metropolitan Planning Council Staff Report

On July 7, 1969, the Metropolitan Area Planning Council distributed to the Technical Committee a draft staff report outlining the Council staff views on the future airport requirements for the Boston metropolitan area. This report entitled, Boston Metropolitan Airport System 1970-1990, was also made available to the Governor of the Commonwealth and the legislative leadership of the General Court as a matter of courtesy.

In essence, the MAPC staff report concluded that there was compelling evidence that the eastern Massachusetts region would require a second major air carrier airport within the 1970-1990 time period and that action should immediately be taken to select and acquire an appropriate site for such an airport facility.

The staff report recommended that further detailed investigation of an airport location in the Douglas-Uxbridge area be

undertaken in order to determine the feasibility of such a facility.

The staff report also recommended examination of major airport sites in the Plymouth-Carver area and the Otis Air Force Base area on Cape Cod as secondary possibilities for a major airport facility within eastern Massachusetts.

Finally, the MAPC staff report expressed strong reservations concerning the General Aviation Airport recommendations of the Consultant Report and, on the other hand, voiced general agreement with the General Aviation Airport recommendations contained in the January, 1969 State Airport Plan of the Massachusetts Aeronautics Commission.

Technical Committee Discussion

On July 9, 1969, ~~the~~ Technical Committee met and discussed the findings and recommendations contained in the MAPC staff report.

Various Committee members expressed strong reservations concerning the desirability and feasibility of the Douglas-Uxbridge area for a major airport site, primarily because of its relatively remote location from downtown Boston.

It was the consensus of the Committee that the agencies comprising the Committee should initiate an intensive Committee effort to identify and evaluate the need for, and possible location of, a second major air carrier airport to serve the

eastern Massachusetts region.

It was agreed that various agencies represented on the Committee would endeavor to provide the technical input that each agency was particularly qualified to supply.

In the matter of air traffic pattern evaluation of airport sites, the Federal Aviation Agency agreed to examine such sites for adequacy of safety and capacity of aircraft operations. In the matters of airport engineering and market suitability, the Massachusetts Port Authority undertook extensive investigations. In the area of highway accessibility and land cost estimates, the Massachusetts Department of Public Works provided basic information. In the area of General Aviation Airport development, the Massachusetts Aeronautics Commission supplied information. Finally, the Metropolitan Area Planning Council provided land use policy information and supplied estimates of the number of residential units affected by various alternative airport sites examined by the Committee.

Technical Committee Deliberations

During the months of August, September and October, the Technical Committee focused its attention on the identification of appropriate sites that would best meet minimum criteria for a major airport facility. As a result of the information developed by the various Committee members, in early November, the majority of the seven member Committee voted to identify

three alternative sites as possible major airport locations, which sites were recommended for detailed consideration and investigation by the Governor and General Court.

It should be noted at this point that the Committee vote to recommend the three sites subsequently identified and discussed in this Committee report was not a unanimous vote.

The Committee then directed that this report be prepared to reflect the work of the Committee and to contain the recommendations of the Committee majority for ultimate submission to the Governor, to the General Court, and to other appropriate agencies of federal, state and local government.

Basic Policy Questions

In the investigation of the future requirements for an airport system to serve the needs of the Boston metropolitan area and the eastern Massachusetts region, the Technical Committee has identified five basic policy questions which must be considered within the context of this report in order to provide a comprehensive metropolitan airport system program.

These questions are as follows:

- (1) Does the Boston metropolitan area and the eastern Massachusetts region require a second major commercial airport during the 1970-1990 forecast period?
- (2) In the event that a second major commercial airport is required, where should such an airport best be located?

- (3) What should be the supplementary airport system for the Boston metropolitan area and eastern Massachusetts region during the forecast period?
- (4) What is the appropriate organizational structure to carry out the airport system program?
- (5) How should the airport development program be financed?

The succeeding Chapters of this staff report will deal extensively with each of these basic policy questions.

Chapter II

SECOND AIRPORT QUESTION

Need for Second Airport

Is there a need for a second major Air Carrier airport for the Boston metropolitan area during the 1970-1990 forecast period? There is no clear or uncomplicated answer to this perplexing question.

To provide policy guidance for the decision levels of state government, the Committee found it necessary to review the forecasted demand levels and anticipated capacity levels for Boston Logan International Airport under a series of alternative assumptions. This data was provided by the FAA, the consultant and the Committee itself.

Logan Airport Demand Analysis

In the examination of the alternative forecasted demand levels for Boston Logan Airport, the Committee has reviewed the forecast data developed by the Consultant, Landrum and Brown, as presented in the Consultant Report, and similar forecast data developed by the Federal Aviation Administration in the publication, Aviation Demand and Airport Facility Requirement Forecasts for Large Air Transportation Hubs through 1980, dated August, 1967.

It shows a need for a second major Air Carrier airport
for the Boston Metropolitan area during the 1970-1980 time
period. There is no direct or unqualified answer to
this important question.

To provide policy guidance for the decision levels of
state government, the Committee found it necessary to re-
view the forecasted demand levels and considered capacity
levels for Boston Logan International Airport under a series
of alternative assumptions. This data was provided by the
BAA, the consultant and the Committee itself.

Forecasted Demand Levels

In the examination of the alternative forecasted demand
levels for Boston Logan Airport, the Committee has reviewed
the forecast data developed by the Consultant, Bandrup and
Associates, as presented in the Consultant Report, and similar fore-
cast data developed by the Federal Aviation Administration in

Forecasted Demand Levels for Boston Logan International Airport

Table 1-1

The forecast data prepared by Landrum and Brown is shown on the next page as Exhibit 3, and the forecast data prepared by FAA is shown on the succeeding page as Exhibit 4.

In terms of the forecast of total aircraft operations for Logan Airport by 1980, the Consultant forecast and the FAA forecast are practically identical.

While there is a remarkable similarity between the Consultant and FAA forecasts of total demand for aircraft operations at Boston Logan Airport by the year 1980, there is an equally remarkable and substantial disparity between the forecast of the three component categories of aircraft operations (i.e., Air Carrier aircraft, General Aviation Aircraft, and Military Aircraft). This disparity is shown as follows:

Forecast Agency	Air Carrier	General Aviation	Military Aviation	Total Operations
Consultant	274,300	180,400	7,000	461,700
FAA	384,000	73,000	8,000	465,000

The Committee undertook a separate evaluation of the three categories of aircraft operational activities, namely, Air Carrier Aviation, General Aviation, and Military Aviation.

(1) Air Carrier

Air Carrier operations are defined as the conventional aircraft operations performed by the American and Foreign airline firms which hold a certificate of public convenience and necessity issued by the Civil Aeronautics Board (CAB).

EXHIBIT 3

BOSTON LOGAN AIRPORT
AIRCRAFT OPERATIONS BY CATEGORY OF OPERATION

<u>Calendar Year</u>	<u>Air Carrier</u>	<u>General Aviation</u>	<u>Military Aviation</u>	<u>Total Operations</u>
1957	114,176	51,131	44,238	209,454
1958	109,994	58,765	33,845	202,604
1959	118,625	56,447	25,845	201,917
1960	119,593	54,620	20,086	194,299
1961	121,191	48,930	14,991	185,112
1962	129,033	57,015	12,504	198,552
1963	143,620	60,059	16,029	219,708
1964	153,154	67,223	13,828	234,205
1965	150,452	76,227	9,819	236,498
1966	158,548	86,045	7,211	251,804
1967	186,491	86,231	6,279	279,001
1968	207,758	99,676	4,867	312,301
1970	206,700	104,300	7,000	318,000
1975	246,300	141,100	7,000	394,400
1980	274,300	180,400	7,000	461,700
1985	295,200	215,300	7,000	517,500
1990	311,600	257,100	7,000	575,700

SOURCES: Landrum and Brown, Air Transportation Potential and Facility Requirements for Metropolitan Boston, September, 1968

FAA, Air Traffic Activity Reports, various years

EXHIBIT 4

BOSTON LOGAN AIRPORT
AIRCRAFT OPERATIONS BY CATEGORY OF OPERATION

<u>Calendar Year</u>	<u>Air Carrier</u>	<u>General Aviation</u>	<u>Military Aviation</u>	<u>Total Operations</u>
1957	114,176	51,131	44,238	209,545
1958	109,994	58,765	33,845	202,604
1959	118,625	56,447	26,845	201,917
1960	119,593	54,620	20,086	194,299
1961	121,191	48,930	14,991	185,112
1962	129,033	57,015	12,504	198,552
1963	143,620	60,059	16,029	219,708
1964	153,154	67,223	13,828	234,205
1965	150,452	76,227	9,819	236,498
1966	158,548	86,045	7,211	251,804
1967	186,491	86,231	6,279	279,001
1968	207,758	99,676	4,867	312,301
1970	204,000	81,000	8,000	293,000
1975	306,000	73,000	8,000	387,000
1980	384,000	73,000	8,000	465,000
1985	N.F.	N.F.	N.F.	N.F.
1990	N.F.	N.F.	N.F.	N.F.

N.F. - Not Forecasted

SOURCES: FAA, Air Traffic Activity Reports, Various years

FAA, Aviation Demand and Airport Facility
 Requirement Forecasts for large Air Transportation
 Hubs through 1980, August, 1967.

The forecasts developed, both by the Consultant and by the FAA, were based upon the following major explicit or implicit assumptions.

- (a) Logan Airport is the only major commercial airport providing the Boston Metropolitan area with the full range of regional, national and international air carrier passenger and cargo service until after 1990.
- (b) No new significant regulatory or economic pricing policy constraints would be placed upon air carrier aviation activity at Logan Airport during the forecast period.
- (c) There would be no constraint on aviation activity growth at Logan Airport because other important parts of national airport system cannot accommodate the forecasted rate of aviation activity to and from Logan Airport until after 1990.
- (d) There is no development of intercity transportation systems significantly competitive to conventional fixed wing commercial airline service between metropolitan Boston and other major travel market cities during the forecast period.
- (e) The historical relationship between national domestic airline passenger growth and domestic airline passenger growth at Logan Airport will continue through the forecast period.
- (f) There would be no major prolonged national defense emergency and no major prolonged national economic depression during the forecast period.

The Committee has noted that there was a very substantial difference between the Consultant Forecast and the FAA forecast of air carrier operations for Boston Logan Airport.

This wide disparity is shown as follows:

<u>Forecast Organization</u>	<u>1980 Boston Forecast of Air Carrier Operations</u>
Consultant	274,300
FAA	384,000

Therefore, the FAA anticipates that the volume of air carrier operations at Logan Airport in 1980 will be approximately 110,000 higher than the level of such operations forecasted by the consultant. The FAA forecast is forty percent higher than consultant forecast.

This substantial difference between the consultant and FAA forecast demonstrates the highly tentative and uncertain nature of the process of forecasting aviation travel growth at the current time.

The substantial difference between the Consultant forecast and the FAA forecast is largely explained by differences in the assumptions regarding the rate of increase of the Gross National Product and the historical base period selected to extrapolate domestic air travel growth.

The wide disparity between the Consultant forecast and the FAA forecast of Air Carrier operations places the Committee in the position where it must consider the alternative forecasts as representing a reasonable range of forecasted operations for this type of aviation activity for Logan Airport.

A substantial change in any one, or any combination of, the forecast assumptions previously discussed could lead to a substantial reduction in the Consultant and FAA forecasts for Air Carrier Operations at Boston Logan Airport.

In the event that a higher speed ground transportation system; for example, either 150 mile per hour railroad service, or a 250 mile per hour Tracked Air Cushion Vehicle (TACV) service, is installed between Boston and Washington, D. C., then it is conceivable that forecasted levels of air carrier passenger travel between the Boston metropolitan area and the New York City metropolitan area would not be realized. Such an occurrence would consequently lessen the level of required air carrier operations at Boston Logan Airport in the future.

Currently, demonstration and research efforts of the DOT Federal Railroad Administration Office of High Speed Ground Transportation are underway to evaluate the transportation and economic feasibility of high speed railroad, TACV, and V/STOL transport systems for possible application within high population density corridors such as the Northeast Corridor (Boston to Washington). The current status of the DOT High Speed Ground Transportation Program provides no policy guidance to the Committee as to the probability of the development of any new transport system within the Northeast Corridor which would affect the forecasted levels of air carrier operations for Boston Logan Airport.

There are currently capacity limitations in other major parts of the national airport system which, if extended through-

out the forecast period, might inhibit the full development of the anticipated increase in Air Carrier operations at Boston Logan Airport. These capacity limitations now exist at the three New York City metropolitan area airports, Washington National Airport and Chicago O'Hare Airport. Such capacity limitations have led to the adoption of a temporary FAA rule which rations the level of all aircraft operations at these airports during the peak hours of air travel.

It was the conclusion of the Committee that it should assume that there would be no long-term capacity restraints within important parts of the national airport system that would substantially inhibit the forecasted level of Air Carrier operations at Boston Logan Airport during the 1970-1980 time period.

In other words, it was assumed that other major metropolitan airport systems, particularly the New York City metropolitan airport system, would be able to accommodate all the Boston originating and terminating Air Carrier flights without limitation or substantial delay.

Consequently, given the current indeterminate status of the DOT High Speed Ground Transportation Program, and given the Committee assumption relative to the absence of capacity restraints within the national airport system, the Committee assumes that the 1990 level of Air Carrier Operational de-

mand for Boston Logan Airport would exceed, as a bare minimum, 310,000 annual operations as forecasted by the Consultant. A Report recently released by the U. S. Department of Transportation* indicates the national demand for Air Carrier operations through 1995. Assuming Boston would follow the national trend, there would be in excess of 500,000 annual Air Carrier operations at Boston by 1990.

(2) General Aviation

General Aviation Aircraft operations are defined as all aircraft operations exclusive of the Air Carrier operations previously defined, and exclusive of aircraft operations performed by military aircraft.

For the purposes of clarification, it should be explained and understood that the term "General Aviation" includes aircraft operations that are in the nature of airline operations performed by so-called "Commuter Airlines." In many cases, these Commuter Airlines perform regularly scheduled, common carrier operations with small aircraft (less than 12,500 lbs.) that generally seat less than twenty passengers. This type of General Aviation operation has increased substantially in recent years and is anticipated to increase further in importance and in volume of operations in the future.

*Report of Air Traffic Advisory Committee, December, 1969

The following brief table shows the comparative Consultant Report and FAA forecasts of General Aviation activity for Boston Logan Airport by 1980.

General Aviation Operations	Consultant <u>Forecast</u> 180,400	FAA <u>Forecast</u> 73,000
-----------------------------------	--	----------------------------------

Therefore, the Consultant forecast of General Aviation activity is 107,400 aircraft operations higher (147.%) than the FAA forecast of this type of aviation activity by 1980.

Quite obviously, the Consultant and the FAA have postulated substantially different forecast assumptions in the development of their respective forecasts.

The Consultant forecast for General Aviation Growth at Logan Airport is based upon the absence of regulatory and/or economic inhibition of such operations at the Airport during the forecast period. In other words, the forecast assumes that General Aviation growth would be encouraged at Boston Logan Airport.

The FAA forecast conversely, assumes a policy of encouraging the anticipated growth of General Aviation operations to occur at other metropolitan area airports (e.g., Hanscom, Norwood, and Beverly airports). The FAA would expect that such other supplementary airports would attract great volumes of General Aviation aircraft operations through the provision of new and improved facilities and services.

The Committee is aware of developing policies such as recently established by the Port of New York Authority, to limit and to inhibit the volume of General Aviation operations at major airports in order to reserve most of the limited capacity (particularly at peak hours of operation) at such airports for Air Carrier operations. The FAA has placed a quota limitation restricting both Air Carrier and other operations at designated high-density airport locations (New York City, Chicago and Washington, D.C.) during selected peak hours. It is the FAA general policy, however, to encourage the construction of supplemental or reliever airport facilities in high-density areas in order to attract and "bleed off" general aviation activity away from congested Air Carrier airports. This permits a higher percentage of use by large transport aircraft at the primary Air Carrier airports.

The Committee would anticipate that, if necessary, such policies would be applied at Boston Logan Airport during the forecast period. The Committee does not foresee that a complete ban on non-Air Carrier aircraft operations at Boston Logan Airport, either during peak travel periods or for the entire day, would constitute a reasonable or desirable public policy. Many types of General Aviation aircraft operations, by reason of aircraft size or aircraft function, and particu-

larly Commuter Airline Operations should be encouraged at Logan Airport during the forecast period. At the same time, the Committee concurs with the FAA that large portions of General Aviation activity should be encouraged to utilize supplemental airports so that the Logan Airport capacity will be primarily devoted to Air Carrier operations especially during peak air travel periods. It is assumed that by 1990 Commuter Airline Traffic will constitute a portion of Air Carrier Traffic.

It is the Committee assumption that the annual volume of General Aviation Aircraft operations at Boston Logan Airport should be assumed not to exceed the 100,000 level during the forecast period.

(3) Military Aviation

The third category of aviation activity is military aviation, which consists of aircraft operated by the U. S. Department of Defense and State Air National Guard organizations.

Unlike Air Carrier and General Aviation aircraft operations, this classification of aviation activity has been characterized by a recent history of drastic decline at Boston Logan International Airport. Both the Consultant Report and the FAA forecast a stable minimum of such operations at Logan Airport during the forecast period. Given the existing trend,

this type of aircraft operation may diminish to the point of disappearance during the forecast period.

For the purpose of airport planning, the Committee assumes that Military Aviation operations at Logan Airport will remain at a minimal level of 5,000 operations annually, which was the approximate level for the 1968 calendar year.

The net result of this analysis is to establish an approximate range of probable 1990 aircraft operations for Boston Logan Airport as shown in the following table:

<u>Forecast Range</u>	<u>Air Carrier</u>	<u>General Aviation</u>	<u>Military Aviation</u>	<u>Total Operations</u>
Low	310,000	100,000	5,000	415,000
High	500,000	100,000	5,000	605,000

It is important to note that the Consultant Report and FAA forecasts were developed in terms of conventional takeoff and landing aircraft (CTOL) operations. Although the Consultant Report discussed the possible future application of short takeoff and landing aircraft (STOL) and vertical takeoff and landing aircraft (VTOL) operations at Boston Logan Airport, no separate forecasts of such operations were projected in the Report.

The possible future development of an economical and reliable STOL and/or VTOL aircraft system, which would serve major Boston air transportation markets from Logan Airport might

supplement some forecasted CTOL aircraft operations with STOL and/VTOL operations. In the event that such STOL and/or VTOL aircraft operations would be operated from other airport site(s) other than Logan Airport, then the CTOL aircraft operations forecast for Logan Airport might be reduced.

Subject to the qualifications discussed herein, the Technical Committee has concluded that, for the purpose of airport system planning, the level of annual aircraft operations forecasted for Boston Logan Airport would be between a minimum of 400,000 annual operations and a maximum of approximately 600,000 annual operations.

Logan Airport Capacity Analysis

In evaluating the alternative capacity levels of Boston Logan Airport, the Committee has been guided by the Consultant Report, by information developed by the Federal Aviation Administration, with particular reference to the FAA Report: A Suggested Action Program for the Relief of Airfield Congestion at Selected Airports, dated April, 1969, and by recent Committee investigation of airport capacity potential.

Until quite recently, the Technical Committee had relied upon calculations of the Practical Annual Capacity (PANCAP) of Boston Logan Airport in terms of annual conventional aircraft (CTOL) operations.

The Consultant Report analysis of Logan Airport PANCAP was undertaken by the firm of Airborne Instruments Laboratory (AIL).*

This firm conducted an extensive investigation of the PANCAP of Boston Logan Airport from alternative airport runway configuration and alternative air traffic operation points of view.

The assumptions and methodology employed by the firm were extensively discussed in the Landrum and Brown Consultant Report and Appendix to the Report.

The AIL firm had based PANCAP at a level where aircraft operation delays are held to a reasonable level on an annual basis.

The firm had determined from previous studies covering a period of years that for airports of a similar size to Boston Logan Airport, that the reasonable practical annual capacity is reached when the average delay is four minutes. The four minute average results in a range of delays to individual aircraft operations from no delay to a delay of eighteen minutes. The firm has selected the four minute delay level, giving consideration to the eighteen minute delay range, to the increased costs of aircraft operation resulting from delay, and to limiting the

*AIL has recently been merged with the firm of R. Dixon Speas Associates.

number of aircraft waiting in a queue (both on the ground and in the air) to a reasonable level. Although the practical hourly capacity component of PANCAP is selected at a specific delay level, the actual movement rate can exceed this number, but with a higher delay level.

The Practical Annual Capacity is a function of the Practical Hourly Capacity analysis based upon long-term observance of the percent of total annual aircraft operations which occur during the peak and non-peak periods of airport use.

Based upon information developed by AIL and FAA, the Committee had originally accepted the PANCAP of Boston Logan Airport at three alternative levels under three alternative assumptions:

These three alternative assumptions are as follows:

- Case I: The existing airport runway layout and the existing aircraft noise abatement operating restrictions that apply to runway 4L-22R.
- Case II: The installation of a second parallel runway (15L-33R) of appropriate length.
- Case III: The installation of second parallel runway (15L-33R) of appropriate length and removal of the existing noise abatement operating restrictions that apply to runway 4L-22R.

These three alternative assumptions yielded the three alternative approximate PANCAP levels for Boston Logan Airport as shown in the following table:

<u>Alternative</u>	<u>PANCAP</u>
Case I	300,000
Case II	343,000
Case III	383,000

The Consultant Report had established the anticipated PANCAP level of Boston Logan Airport at 390,000 annual CTOL aircraft operations for airport planning purposes. The FAA accepted and confirmed the AIL PANCAP estimate of 390,000 based upon the assumptions and methodology employed by AIL in the development of the Airport capacity potential.

The AIL and FAA estimate of a 390,000 PANCAP was based upon present knowledge of navigational aids, air traffic control procedures, and anticipated aircraft performance characteristics.

Recently, with the further assistance of AIL, new calculations of Logan Airport PANCAP have been developed and are based upon the following three elements:

- (1) Maximum Airport Expansion
- (2) New Air Traffic Control Procedures
- (3) New Aircraft Technology

(1) Maximum Airport Expansion

The Logan Airport Maximum Expansion Program is shown on the plan on the following page and would contain the following major features:

- (a) Construct a parallel runway 15L-33R of 9200' in length and 1200' north of the existing 15R-33L runway.

1970 SYSTEM STUDY PLAN BOSTON-LOGAN INTERNATIONAL AIRPORT



- Land Fill Areas
 - Existing Coastline
 - Existing Runways
 - Proposed New Coastline
 - Proposed New Runways and Extensions
- SCALE IN FEET
500 0 500 1,000 1,500 2,000

- (b) Construct a 2000' extension to runway 4L.
- (c) Construct a 1400' extension to runway 9.
- (d) Construct a 1700' extension to runway 22L.
- (e) Construct a 700' extension to runway 22R.
- (f) Construction of two short independent runways of approximately 3500' in length parallel to runway 15-33 and 4-22 for STOL and CTOL general aviation aircraft.
- (g) Permit full utilization of the parallel 4-22 runways and 15-33 runways without restriction for landings and takeoffs for all types of Air Carrier aircraft.
- (h) Improve the taxiway system as necessary to expedite flow of aircraft movements.
- (i) Continue expansion and improvement of the roadway system, terminal area and support facilities as currently planned.
- (j) Increase the capacity of the access highway system and of alternative ground access systems. This capacity would be realized through construction of the third harbor vehicular tunnel and through provision of vastly improved public transit service to the airport.

The Committee noted that the new facilities described in sub-paragraphs (a) (b) (c) and (i) are included in the 1970 official Logan Master Plan (Airport Layout Plan) which indicates the facility requirements to 1980.* The remaining sub-paragraphs describe new facilities relating to the maximum expansion program recommended by the Committee relating to Airport system

* It should be noted that the official 1970 Logan Master Plan includes a 1,500' extension of existing runway 27 toward Winthrop and includes a new 8,500' dual runway 9R-27L which are not included in the Maximum Airport Expansion Program shown in this Report.

requirements considered in this Report.

Construction procedures anticipated in the various proposed expansion projects include the construction of rock dike enclosures and filling operations. The extension of runways 22L and 22R would require the excavation and dredging of a waterway in the Bayswater St. Area to maintain tidal flow to marine recreational areas west of the runways and in Belle Isle Inlet.

(2) New Air Traffic Control Procedures

The development of new and improved aircraft handling procedures would include the following;

- (a) Equip runways with a ground traffic control system to automatize the aircraft crossing of the inboard parallel runway.
- (b) Installation and operation of a new terminal area control system called "ART III" by the Federal Aviation Administration.
- (c) Implementation to the extent practical the recommendations of the Air Traffic Control (ATC) Advisory Committee Report for the U.S. Department of Transportation, dated December, 1969.

(3) New Aircraft Technology

Recent experimentation and limited operating experience indicate that Short Take Off and Landing (STOL) aircraft may be feasible for extensive use in commercial air transport and would be particularly adaptable for use in the Northeast Corridor between Boston and Washington, D.C. If such aircraft

can be operated at Logan Airport independently of conventional aircraft (CTOL), then the capacity potential of Logan Airport could be increased very substantially. In the expectation that extensive STOL operations would be conducted at Logan Airport in the future, the Logan Airport Program proposes installation of two, short independent runways of approximately 3500' in length for STOL and General Aviation aircraft operations.

Revised PANCAP estimate

With the expectation that the three preceding elements will be realized during the forecast, revised Logan Airport PANCAP levels for the current year (1970) based upon existing air traffic control procedures and for a future year (1980) based upon substantially new and improved air traffic control procedures have been developed by AIL.

The following table shows the recent estimate of PANCAP for CTOL operations at Boston Logan Airport:

<u>Airport Condition</u>	<u>1970-1980 PANCAP</u>	<u>1980-1990 PANCAP</u>
Existing Airport	327,000	373,000
New Parallel Runway 15-33	386,000	443,000
Fully Useable Runway 4-22's	403,000	450,000

Therefore, the revised estimate of future (1980) Logan Airport PANCAP for CTOL aircraft operations is approximately 450,000 as compared to the Consultant Report previous estimate of 390,000. This estimate of PANCAP is 60,000 annual aircraft operations higher (15%) higher than the previous estimate. The PANCAP increase for CTOL operations is primarily attributed to improved air traffic control procedures assumed by AIL.

The following table shows an estimate of Logan Airport PANCAP for STOL and General Aviation operations, which would be in addition to the CTOL PANCAP:

<u>Airport Condition</u>	<u>1970-1980 PANCAP</u>	<u>1980-1990 PANCAP</u>
New STOL Runway(s)	260,000	300,000

Consequently, the combined CTOL and STOL annual aircraft operational capacity is summarized in the following table:

<u>Aircraft Operations</u>	<u>1970-1980 PANCAP</u>	<u>1980-1990 PANCAP</u>
CTOL	403,000	450,000
<u>STOL</u>	<u>260,000</u>	<u>300,000</u>
TOTALS	663,000	750,000

Thus, it can be easily seen that the recent estimate of a combined CTOL and STOL and General Aviation Logan Airport Capacity of 750,000 annual aircraft operations is practically double (92.3% higher) that of the Consultant Report PANCAP estimate of 390,000 CTOL aircraft operations.

Therefore, there is a wide difference in the level of future Logan Airport PANCAP, depending upon the validity of the assumptions utilized to compute Airport Capacity.

At one extreme, there is the Logan Airport future PANCAP estimate of 327,000 operations, which is based upon the following assumptions:

- (1) No further Airport expansion for CTOL operations.
- (2) No future improvements to the Air Traffic Control system.
- (3) No substantial STOL operations at Logan Airport because either such operations are economically unsound or because independent STOL operations are physically not feasible (e.g., separate STOL runways are not constructed).

Under this series of extreme assumptions, there would be practically no doubt that there was a critical and immediate need for a second major Air Carrier Airport to serve the eastern Massachusetts region.

At the other extreme, there is the Logan Airport future PANCAP estimate of 750,000 operations, which is based upon the assumptions postulated by the Committee.

It should be noted that the previously mentioned U.S. Department of Transportation recently released Report of Department of Transportation Air Traffic Control Advisory Committee (generally referred to as the "Alexander Report") relative to

new and improved air traffic control procedures anticipates that future air traffic control procedures could provide a substantially greater total PANCAP for CTOL operations at Logan Airport than the 450,000 annual operations most recently estimated by AIL.

On the other hand, FAA has presented the following information:

"There is an entirely new potential capacity restraint now present which would require additional separation in the handling of "heavy jets" i.e., aircraft weighing in excess of 300,000 lbs.* There is now a requirement to use 5 mile radar separation (formerly 3) between these aircraft and others which might be affected by their wake turbulence, and to use at least a two minute interval behind a heavy jet where parallel runways are less than 3500 feet apart or flight paths cross under several conditions. These increased requirements apply regardless of IFR or VFR status of the aircraft involved. Although it is too soon to know the full impact of these requirements, it is clear that an airport such as Logan, which will be handling an increasing number of these aircraft in a wide mix of types, will suffer a reduced capacity. We mention this primarily so that the Committee will not be overly optimistic regarding the MPA's future forecast of capacity at Logan at 450,000 total annual operations."

Under the assumption that Logan Airport would be able to accommodate the full range of CTOL types of aircraft up to a PANCAP of 450,000 annual operations, together with the assumption that an additional 300,000 STOL aircraft operations could

* "heavy jet" include Boeing 747, Boeing 707, DC-8-60 series intercontinental, DC-8 intercontinental, VC-10, IL-62, C-141 and B-52 aircraft.

be accommodated at Logan, then there would be great doubt that there was a need for a second major Air Carrier Airport within the 1970-1990 forecast period, or for some time thereafter.

There is, obviously, the probability that some, rather than all, of the assumptions postulated by the Committee may be attained in the future. For example, in the event that no further airport expansion occurs, and STOL operations do not prove feasible at Logan Airport, but improved Air Traffic Control procedures do occur as anticipated, then Logan Airport future PANCAP would approach 373,000 operations. This PANCAP level would present a strong case for the need of a second Air Carrier Airport during the forecast period.

The most critical element in terms of a large Logan Airport future PANCAP increment, is the STOL aircraft potential of an additional 260,000 operations annually. In the event that only this PANCAP increment potential was realized to the exclusion of airport expansion for CTOL aircraft operations, then the Logan PANCAP would approach 587,000 operations during the forecast period.

This future PANCAP level would cast some significant doubt on the need for a second major Air Carrier Airport during the forecast period.

The element of improved air traffic control procedures will be determined through aeronautical technology and national public policy as reflected by new federal government (FAA) financial programs and regulatory action. The Technical Committee is not in a position to predict the timing or the character of future air traffic control procedures that might result in a substantially higher PANCAP for Logan Airport, other than to anticipate that at least some improvement would occur during the forecast period.

The element of operationally independent, economically sound, and environmentally acceptable STOL aircraft operations at Boston Logan Airport during the forecast period is a function of aeronautical technology and transportation economics on a national and regional level (e.g., the Northeast Corridor). The Technical Committee is aware of recent intensified optimism regarding the practical early application of STOL aircraft operations at Logan Airport for service to other areas within a 500 mile range of metropolitan Boston. A Civil Aeronautics Board (CAB) Initial Decision in the Northeast Corridor VTOL investigation (Docket No. 19078), issued on February 2, 1970 by a Board Examiner, presented extensive evidence that STOL aircraft would provide early, large scale common carrier air service within the Northeast Corridor. Notwithstanding this optimistic CAB analysis,

there is still substantial debate whether STOL, CTOL, VTOL, TACV, high speed railroad, or other transportation systems would meet the future major travel demands within the Northeast Corridor. The Technical Committee can take note of this debate, but the Committee cannot predict either the extent or the timing of the introduction of STOL aircraft common carrier service at Boston Logan Airport.

Logan Airport Expansion Analysis

The evaluation of the Logan Airport Expansion Program is considered under four separate aspects as follows:

- (1) Airport Capacity
- (2) Program Cost and Financing
- (3) Proposed Aircraft Operations
- (4) Social Impact

(1) Airport Capacity

As previously disclosed, the Logan Airport expansion program would increase airport capacity from 327,000 annual operations of CTOL aircraft to 403,000 annual operations based upon existing air traffic technology, and would increase airport capacity from 373,000 annual operations to 450,000 CTOL operations based upon anticipated future technology.

The expansion program would not only provide a quantitative increase in CTOL aircraft operating capacity in terms of accommodating a higher volume of aircraft, but would also provide a qualitative increase in capacity in terms of accommodating air-

craft under a greater variety of weather and aircraft weight conditions than is now possible with the existing airport runway configuration.

The Committee recognizes that the Logan Airport maximum expansion program, while providing for a substantial added airport PANCAP, does not meet the ideal criteria for a major Air Carrier Airport that were established in the Landrum and Brown Consultant Report. Among the ideal criteria that could not be met at Logan Airport are:

- (1) Provision to Extend Primary Runways to 15,000' ultimate length.
- (2) A minimum of 5,000' separation between primary parallel runways to accommodate simultaneous independent aircraft operations.
- (3) Ultimate provision of double sets of primary parallel runways.

It is believed, however, that this Logan Airport Expansion Program presented herein is not defective merely because it cannot meet the ideal Airport criteria developed in the Consultant Report. This matter is discussed at some length in Chapter III of this Report.

The purpose of this Logan Airport Expansion Program is, quite clearly, to preserve the traditional role of Boston Logan Airport to serve the eastern Massachusetts region with the full range of short haul, medium haul and long-haul airline services during the forecast period. This role might be

slightly modified by the necessity of shifting some short-haul airline service to a supplementary airport or to supplementary airports within the metropolitan area.

(2) Program Cost and Financing

The Airport Expansion Program presented herein is estimated to require an investment in the vicinity of \$150,000,000 for landing area improvements.

The Massachusetts Port Authority is confident that the expansion program can be financed through the sale of Port Authority revenue bonds which would be amortized through Airport "user charges" and federal airport aid funds, if available, and thus require no pledge of funds from state or local governmental units.

(3) Proposed Airport Operations

The proposed expansion of runway facilities at Logan would permit full utilization of parallel runway systems 4-22 and 15-33 to accommodate future traffic volumes. Preferential runway utilization would continue to be implemented to the extent consistent with weather conditions and traffic intensity. The landing threshold on existing runways could be maintained although takeoff operations would be from the physical end of the runways.

Standard operational procedures call for utilizing the outboard parallel runway for landings and the inboard runway

for takeoffs, although simultaneous use of the parallel runways for landings and takeoffs is sometimes employed to accommodate unbalanced arrival and departure traffic. Runway 9-27 could continue to be used as a departure runway but only to the extent that it would not interfere with operations on the proposed 4-22 and 15-33 STOL runways.

Wind direction, velocity and low visibility weather in the Boston area requires an instrumented parallel runway configuration oriented in the 4-22 and 15-33 direction to achieve reliability in airline scheduling and realistic annual airport capacity. There is however sufficient tolerance in the annual weather conditions so that more than 50% of the annual operations can be conducted on either set of parallel runways making it possible to operate the airport utilizing preferential runways when weather conditions permit. The proposed STOL facility would be operated in parallel with the CTOL operations.

The approach and departure paths of aircraft using Logan produces a noise exposure on the communities in the environs of the airport. Takeoff and landing operations conducted on the runways pavement also produces a lateral noise exposure on areas adjacent to the runway pavement. In general the takeoff noise is of longer duration than that experienced from land operations, although the use of full reverse thrust on landing is as

noisy as full power on takeoff. Longer runways for landing will decrease the need for use of full reverse thrust.

In the proposed expansion plan for Logan the use of runway 22R for landings and 4L for departures will increase the exposure area north of the airport and adjacent to the extended end of runway 22R. However, exposure due to takeoff from the extended end of runway 4L should not be significantly different than present operations from 4R. Since the primary use of runway 4R-22L will be for landing operations, it is expected that the exposure to lateral noise in the Winthrop area would be reduced. Departures from the extended end of runway 9 would also reduce the exposure in Winthrop.

Existing noise abatement procedures applicable to takeoffs from runway 22R require the aircraft to change course after takeoffs to a magnetic heading of 195° so as to avoid the South Boston community. This operational procedure would be continued.

The proposed 15L-33R landing runway would not change the exposure to Winthrop and would reduce the exposure in East Boston from arrival traffic. Departure traffic on existing runway 15R-33L would not change the existing exposure. Runway 15R is the preferential departure runway when weather conditions will permit.

It is not expected that the proposed STOL facility would produce any exposure on the communities adjacent to the airport. This facility would be used by general aviation aircraft and STOL aircraft which will have high approach and departure paths.

Existing annual flight operations are approximately equal on runways 4R-22L, 4L-22R, and 15R-33L. Operations on runway 9-27 is approximately 2/3 of the volume noted for any one of the above three runways. The above noted traffic distribution was obtained from the 1968 operational records which are the most representative of actual runway utilization. The 1969 operations were artificially unbalanced because of runway construction. A similar unbalance will be experienced in 1970 due to runway overlay construction.

The proposed airport expansion program calls for full utilization of the 4-22 and 15-33 parallel runways and limited utilization of runway 9-27.

At the present time annual aircraft operations at Logan are approximately 300,000. With the restriction on runway 4L-22R the air carrier operations are conducted on the equivalent of $3\frac{1}{2}$ runways. The proposed development calls for 450,000 CTOL operations on 5 runways with separate and re-

mote facilities for general aviation and STOL operations which provide added capacity in the range of 260,000 to 300 annual operations. With effective action by the Federal government, it is expected that future aircraft operations will produce less noise exposure on the adjacent communities.

(4) Social Impact

The Committee recognizes that the proposed extension of runway 22L and runway 22R will extend these runways towards the Bayswater Street-St. Andrews Road area of East Boston in such a manner that removal of some residential structures will be required. A large portion of these structures are multi-unit structures. It is estimated that a minimum of 1000 persons would be displaced as a result of these two runway extensions.

The Committee is of the opinion that the remaining runway projects outlined in the Logan Airport Expansion Program will not require acquisition of residential units in other parts of East Boston, Revere and Winthrop.

Second Airport Site

Although this report anticipates that an expanded Logan

Airport, improved air traffic control procedures, and the introduction of extensive STOL aircraft operations, in conjunction with limited Air Carrier service operated from other supplementary airports, would probably satisfy the Air Carrier Airport requirements for the eastern Massachusetts region during the forecast period, the Committee does recognize the possible need for a second major Air Carrier Airport during the latter part of the forecast period, or sometime thereafter.

As a result of this recognition, it is recommended that steps now be taken to authorize the preservation of a preferred airport site of approximately 14,000 acres within eastern Massachusetts. This site could be initially developed and operated as a relatively small airport for General Aviation use and be subsequently expanded to major Air Carrier Airport standards if and when the demand for such an airport occurs.

In the event the factors (airport expansion, improved air traffic control technology, and extensive STOL aircraft operations) presumed to accomplish the substantial PANCAP increase are not realized, then the need for the second Air Carrier Airport becomes more critical and immediate.

The Crucial Question

In the opinion of the Technical Committee, the need for, and timing of, a second major Air Carrier Airport is dependent

upon whether the Massachusetts Port Authority is permitted to undertake and complete the expansion program proposed for Boston Logan International Airport.

In the event that the program is not undertaken and completed, ~~then~~ Logan Airport would become seriously deficient in terms of its ability to handle the anticipated volume of all types of Air Carrier aircraft under a wide variety of weather conditions during the forecast period.

The various public agencies represented on the Technical Committee recognize an obligation to weigh the public benefits and the public costs of the Logan Airport Expansion Program and to advise the Governor and General Court of their reaction to the program.

This is a very difficult decision for each of the agencies represented on the Technical Committee.

On the one hand, there is the undeniable superior location of Boston Logan Airport in terms of providing convenient air transportation to the people of the Boston metropolitan area and in terms of constituting a valuable asset to the economy of the area. The very large public and private investment already committed to Logan Airport is a strong factor favoring its continued expansion and unrestricted use. Finally, a continued expansion of Boston Logan Airport is undoubtedly the least costly

alternative in terms of dollar amounts and the most financially attractive alternative in terms of probably requiring no direct state financial assistance.

On the other hand, there is the critical existing incompatibility between the operation of Boston Logan Airport as an all purpose major Air Carrier Airport and the densely populated residential areas closely proximate to the Airport. The Logan Expansion program would intensify and extend this basic land use incompatibility to the point that a significant number of dwelling units would be displaced.

These conflicting considerations describe the dilemma confronting the Technical Committee members.

In the opinion of the Technical Committee, the character, timing, and extent of the airport system need to serve the eastern Massachusetts region is dependent upon an early decision by the state government as to whether the Logan Airport expansion program should be undertaken or discarded.

If the decision is to permit the Logan Airport expansion program, then there is still a possibility that a second major Air Carrier Airport would become necessary during the forecast period, or for some time thereafter.

If the decision is to either prohibit, or substantially dilute, the Logan Expansion Program, then there is a strong

probability that there is a critical and immediate requirement for a second major Air Carrier Airport.

Technical Committee Conclusions

It is the conclusion of the Technical Committee majority that the Logan Airport Expansion Program, as described in this section of the Report, should be undertaken and completed by the Massachusetts Port Authority.

There is basic agreement among the majority of Technical Committee members that the Logan Airport Expansion Program outlined in this Chapter, plus the development of a supplemental airport system as described in Chapter IV of this Report, would serve as a probable alternative means to meet the anticipated growth of Air Carrier operations within the eastern Massachusetts region during the forecast period.

The Technical Committee is in unanimous agreement, irrespective of the ultimate fate of the Logan Airport Expansion Program, that the Commonwealth of Massachusetts should now take steps to reserve an appropriate site within eastern Massachusetts for possible use as a second major Air Carrier Airport.

...the ... of the ...

...the ... of the ...

It is the conclusion of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...

There is a ... of the ...
...the ... of the ...

...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...

The ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...

CHAPTER III

SECOND AIRPORT LOCATION

In view of the Technical Committee agreement that it is now time for the Commonwealth of Massachusetts to identify and reserve an appropriate second major airport site to serve the eastern Massachusetts region, the Committee then devoted much time and effort in an attempt to identify feasible and acceptable sites for such a facility.

Site Selection Criteria

In the investigation of possible major Air Carrier Airport sites, the Committee developed four major criteria for the purpose of evaluating the transportation, economic and social feasibility of various sites.

The following were the criteria applied consistently to each site in order that an effective and objective analysis could be made:

- (1) Market Potential Realization (maximum service to the air market and accessibility).
- (2) Air Traffic Control (air space compatibility).
- (3) Social Impact (compatible land use).
- (4) Engineering Design and Development Costs (topographical suitability, etc.)

(1) Market Potential Realization

This parameter explains the need to locate any air carrier airport as reasonably close and accessible (as possible) to

the potential air traffic market.

Marketability and accessibility defines the volume of potential users of a new major air carrier airport facility and, in turn, determines the degree to which such a facility can financially support the capital and operating costs that would be incurred.

The Consultant Report and Appendix extensively discussed these factors as a primary determinant for the selection of an appropriate airport site. The Consultant Report and Technical Committee have placed very heavy emphasis on this factor as a guide for the location of a second major air carrier airport to serve the Boston Metropolitan area.

The Consultant has stated that by 1990 there will be significant areas of local (air trip origins) air passenger potential in the southwest, south and southeast sections of the Boston metropolitan area beyond Route 128, but that the area within the Route 128 Expressway will remain the "heart of the Boston metropolitan area market" and also that of the eastern Massachusetts total transportation system.

The Consultant Report has identified the considerations of the ground access travel time and the distance traveled between the airport location and the air passenger point of trip origin or destination as particularly critical in the expected volume of total airline passenger trips.

It is evident that the character and extent of the future highway system is a crucial consideration in the selection of a second airport location.

The DPW programs for regional highway development, particularly the Recommended Highway and Transit Plan for the eastern Massachusetts region dated January 31, 1969, were reviewed in conjunction with the various airport sites under consideration.

The Committee was concerned with the problem of allocating highway costs to alternative airport sites. It was agreed that the costs of access (Right-of-Way and Construction) from regional highway facilities to the airport boundary is a direct cost applicable to the capital outlay of the airport.

Region-wide facilities, including those now built, those programmed for reconstruction or improvement, and those recommended for future construction are not capital outlays chargeable to an airport which may be constructed in the vicinity. These facilities shall necessarily have met the test of economic feasibility for all travel purposes. They are required to move people and goods in the general public interest and are therefore not to be allocated as direct costs to an airport which is but one of a multitude of land use trip generators in the regional fabric.

The provision of some form of convenient public ground transportation to the proposed airport site is also essential.

at the transfer and extent of the...
system is a central consideration in the selection...

The new program for regional... development, particularly for the...
for the...

... were reviewed in...
cooperation with the various airports under...
The Committee was concerned with the problem of...
highway route to alternative... It was...
the roads of access (right-of-way and...)
national highway facilities to the... is a...
cost applicable to the capital... of the...

... facilities, including those...
programmed for construction or improvement, and these...
measures for future construction are not capital...
able to an airport which may be constructed in the...
These facilities shall necessarily have met the...
feasibility for all travel purposes. They are required to...
people and goods in the general public interest and are...
not to be allocated as... to an airport...
is but one of a number of... and this... in...

... fabric.

... of government public...

This need not necessarily mean rail transportation. If good quality roads are available, a bus service might be adequate for a limited period. Proximity of the proposed site to an existing high-grade railroad or rapid transit line would be an important element in site selection. The acquisition of little-used or abandoned railroad lines or spurs which could facilitate bringing mass transportation closer to the site should be given serious consideration. Such rights-of-way would also lend themselves to use by air-cusion vehicles or one of the other forms of vehicle guidway systems which are now under development in this country and abroad.

Also, the future may bring novel types of aircraft suitable for public transportation between the airport and the city center.

(2) Air Traffic Control

This criterion covers the ability of a major Air carrier Airport site to permit a specified level of aircraft operations in an operationally safe and efficient manner within the context of an area's total airport system and an area's air traffic control system.

Such an airport must be located so as to avoid aircraft operational conflict with other important existing or planned airports within the total system.

In order that reasonably conflict-free air space areas could be determined within the metropolitan Boston air space to permit the compatible incorporation of any new facility within the total airport system, the FAA, which is responsible for the air traffic control system, undertook to evaluate the compatibility of the various proposed major airport sites from an air traffic control point of view.

The FAA technique analysis was based upon accommodating the maximum number of aircraft operations with minimum intervals between aircraft arrivals and aircraft departures.

It should be noted that an air traffic control consultant (AIL) determined that where an air space conflict, as identified by FAA in some cases, did exist, the conflict could be resolved in an operationally safe manner by means of altitude separation techniques. Such techniques, however, would not allow the maximum capacity of either the second major airport or Logan Airport to be realized.

(3) Social Impact

The Technical Committee is aware that a second Air Carrier Airport, based upon the aeronautical criteria deemed necessary for such a facility, would consume a large area within eastern Massachusetts both in terms of the area required for physical facilities and the area within which certain land uses (e.g., educational and residential) should be excluded or specially treated because of probable exposure to aircraft noise.

The Committee recognizes that land located within eastern Massachusetts is a limited and valuable resource in terms of land development and land conservation purposes.

The Committee is also particularly cognizant of the possible human hardships that would be implicit in the acquisition of dwelling units, institutions and business firms, and the relocation of persons, activities and jobs that would be required to accommodate a second Air Carrier Airport facility within eastern Massachusetts.

From an ideal point of view, a second major commercial airport would require minimum relocation of persons, institutions and business firms.

It is to be emphasized that a major airport would constitute a major economic asset to the general area in which the airport was located. Such an airport would generate a large number of job opportunities, substantial new income, and industrial, commercial, institutional and residential development within the areas surrounding the airport.

Compatible land use planning considerations are critical to the location of a major Air Carrier Airport.

Land use planning begins with the selection of an adequate site that satisfactorily meets the parameters outlined in this chapter. This must take place years in advance so that the required real estate may be available for its development.

This is essential in view of the rapidly disappearing undeveloped land within a reasonable ground travel distance from cities, the rapid growth of air transportation itself and the long lead-times needed to design, construct and finance major airports. In this regard, the concept of a land bank where land would be set aside for future airport development, in advance of the detailed planning stage is one which merits serious consideration.

An important advantage of acquiring land in advance is that a suitable location may be obtained at a lower cost. The savings which might be realized from such a program could be quite substantial, particularly in view of rapidly rising land values.

Another important advantage gained from advance acquisition of land is the opportunity for integrated planning and development of airport complexes; i.e., the airport itself, related functions, and surrounding areas. In this way, the harmonious integration of the airport and its environment (local/regional) can be insured and be better coordinated, permitting, at the same time, the area immediately adjacent to the airport to be developed with airport-compatible uses.

It is evident that an airport needs to become an integral part of the planning process involved in local, metropolitan and regional development. The airport should fit into plans

for community expansion so that needed space can be allocated for airport development. The airport must have sufficient land to operate efficiently, and the land use must be compatible with the activities of the airport and the community. For example, industrial parks and other commercial developments have proved to blend well with the airport in optimum land usage. Such a cooperative effort assists planners in determining the degree of impact by an airport of this size upon a community in terms of numbers of people adversely affected. Essentially there are three main categories in which people's attitudes toward airports can be placed:

1. Totally unacceptable; i.e., a person must move because of noise and/physical displacement.
2. Partially unacceptable; i.e., individual does not necessarily like an airport as a neighbor, but can tolerate it.
3. Acceptable.

In order that adequate buffer zones could be established at the side and ends of the runways, the dimensions used establishing site criteria were based upon noise standards contained in the recently adopted FAA regulation entitled: NOISE STANDARDS: AIRCRAFT TYPE CERTIFICATION, Part 36 of FAA Regulations, effective December 1, 1969.

Additional buffer zones were established beyond those provided by the FAA regulation. These buffer zones provide

more than adequate protection from excessive noise to any airport area residents.

The following are the buffer zone criteria used:

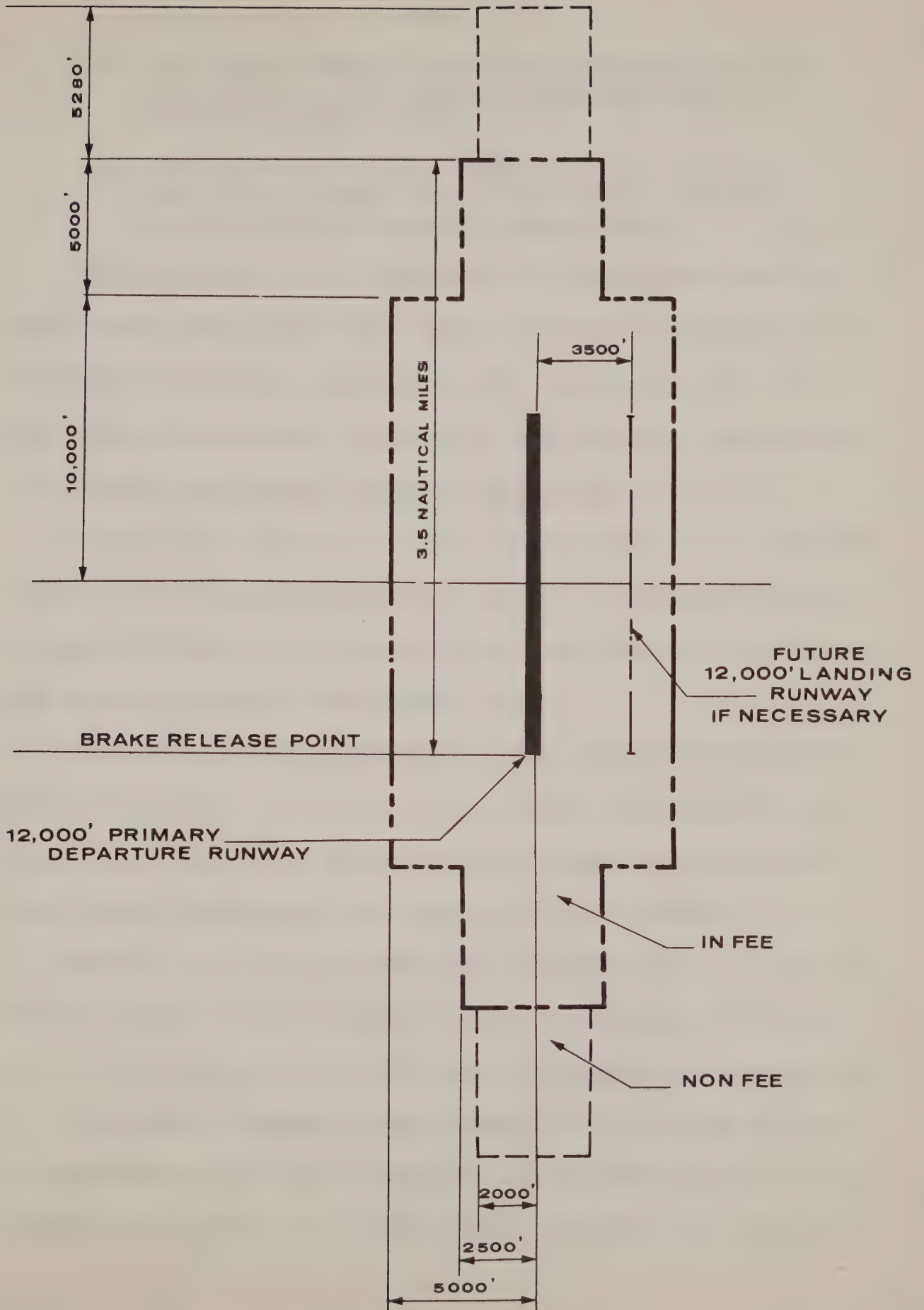
1. Distance laterally from the runway centerline is 5,000 feet. (FAA gives this distance as 1,520 feet.) Distance (at 5,000 feet laterally) to a point 16,000 feet out from brake release. The resulting area is referred to as the "IN-Fee" area, or the land acquisition area.
2. As additional buffer zone insurance there is included an area 5,280 feet in length by 4,000 feet wide beyond the end of the in-fee zone at the ends of the runway. This would be a controlled compatible land-use zone, but a "Not-in-Fee" area; i.e., non-airport property. Thus, a combined total of 26,280 feet along the runway centerline is used. (FAA indicates a distance of 24,288 feet).

Figure 1 on the next page shows the dimensions of the "In-Fee" and "Not-in-Fee" areas for a 12,000' primary departure runway.

Noise reduction potentials can be categorized into three means for achieving this objective:

- (1) the most important means is to first reduce the noise at the source (i.e., that produced by the airplane).

Figure 1



- (2) the second means is to operate airplanes on paths and profiles over sparsely populated areas to the extent practicable.
- (3) the third means is to coordinate land uses so that areas exposed to aircraft noise are compatible with the expected noise level.

The objective of all concerned is a "roll-back" of aircraft noise from exposed land areas and population while simultaneously maintaining appropriate air commerce growth rates. The technical prospects for such an objective are encouraging.

(4) Engineering Design and Development Costs

Within this criterion are such considerations as airfield design, including runway-taxiway design; orientation; longitudinal gradient, site grading and paving; terminal area design and estimated capital development cost.

It is further recognized that a new airport should be designed so as not to interfere with natural and man-made water systems and watersheds which must be preserved and protected during both construction and operation of the airport.

Water is an extremely valuable resource and full attention must be given to its incorporation in the planning of the airport of whatever protection devices and procedures are required.

Clearing of natural ground cover and the filling of low wetlands should be held to the absolute minimum consistent with landing and terminal area development, together with other "In-

Fee area uses. Re-establishment of good ground cover on newly graded areas is imperative to minimize erosion. Proper drainage should be established to maintain the existing watersheds and minimize the increase in runoff rates and stream velocities.

Planning criteria indicate a major Air Carrier Airport needs to provide all weather service with adequate approach protection for full instrument Landing System/Approach Lighting System capability to include provision for future Category II (100' decision height; 1200' runway visual range) and, ultimately, Category III (0' decision height; 0' runway visual range) aircraft operation. The instrument landing facility provides electronic guidance on the final portion of the approach to land an aircraft safely under low-ceiling and limited-visibility conditions. The approach lighting system is a facility which provides a visual reference.

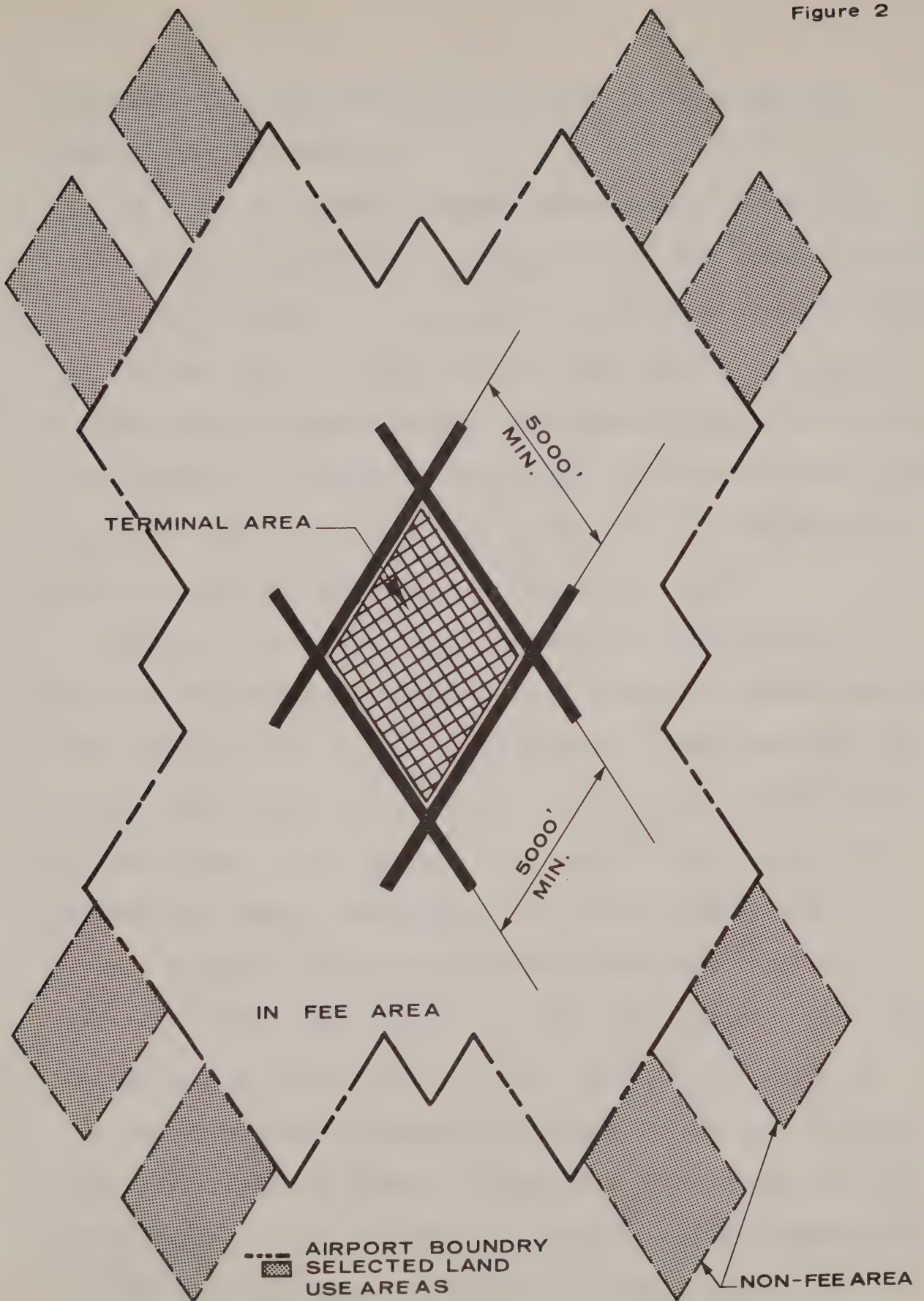
The runways for a new major Air Carrier Airport should have an ultimate expansion capability to 15,000 feet in paved length with an initial requirement for 12,000-ft. runways. A 12,000' initial runway length is postulated in order to compensate for different terrain and altitude conditions at various airport sites.

Present airfield ideal planning standards call for a minimum of 5,000 foot separation between parallel runways in order

to accommodate simultaneous and independent operations in instrument weather conditions. This separation is the basis used to establish the schematic runway layout depicted in Figure 2 on the next page.

However, it should be noted that current studies indicate that in all probability this 5,000 foot criteria can be reduced to 3,500 feet and conceivably slightly lower without impairment to the type of anticipated operation mentioned in the previous paragraph. Even if this reduced separation should become a reality, however, intelligent planning, for the magnitude of facility discussed herein, dictates the 5,000 foot figure be retained to enable the accommodation of a proportionately sized terminal development in the central area. In addition, future second and third generation jumbo jets will require greater runway-taxiway-apron taxiway separations than are now required, which, if realized, would be more easily accommodated with the 5,000 foot separation rather than 3,500 feet. The airfield master plan should be further designed to accommodate the addition, when and if required to increase airfield capacity, of two outboard landing runways. These additional runways should be separated from the parallels by 3,500 feet, under present planning dictum to permit simultaneous independent operation. Again, as stated before, this

Figure 2



SCHEMATIC OPEN PARALLEL RUNWAY LAYOUT

separation may very well be reduced and still permit the desired type of operation.

In order to provide a proper relationship to the airfield so as to expedite aircraft operation, the terminal area should be centrally located, permitting minimum aircraft crossing problems with minimum delays in peak periods (see Figure 2). A major new Air Carrier Airport with these airfield and terminal area facilities in proper sequence and relationship would allow a maximum capacity in the order of 700,000 to 1,000,000 annual operations, as estimated in the Consultant Report.

As with most areas along the Atlantic Coast Region, low ceilings and reduced visibility occur primarily during easterly wind circulations. The greatest departure from uniformity of weather conditions throughout the region occurs during periods of light wind. Areas exposed to marine effects during these periods will have a tendency to some light winds, while a greater frequency of zero wind speed (dead calm) will be greater at these more inland stations, particularly where the terrain at the airport site is lower than its surroundings.

The exact meteorological conditions for any one location will differ from any others. Particular differences are not determinable without an extensive on-site weather observation program. For preliminary planning purposes, however, a

sufficiently homogeneous wind speed and direction exist in the weather of the area so that the wind and weather information from Boston-Logan International Airport and Hanscom Field can be considered representative of the general weather conditions at the considered sites. This was demonstrated in the results of computer analysis of five years of data at each airport.

In general, then, airports throughout the region should have runways oriented in directions similar to each other. Differences in wind and weather conditions at them should be slight. Those airport sites located south of a line running from the southwest through Boston-Logan International Airport to the northeast will have weather conditions similar to Logan, while sites located north of this line will have weather very much like that at Hanscom Field. For example, other existing airports having weather conditions similar to Boston-Logan International Airport would include the Beverly Airport, the Norwood Airport and the South Weymouth Airport.

Whenever possible, a maximum longitudinal runway gradient of 0.5 per cent was applied, although a desired design gradient would be 0.00 per cent to 0.25 per cent. In some sites studied, the existing terrain was such that an extremely high per cent of runway gradient was necessary, it being 1.0 per cent, which

might be considered unacceptable by some aviation experts. The basic runway length of 10,500 feet is adjusted to 12,000 feet based on the increased altitude and runway gradient. Gradients in excess of 0.00 per cent require lengthening of the basic runway dimensions by 10 per cent, thus increasing runway construction costs in hilly terrain.

In its investigations of alternative sites for a second Air Carrier Airport to serve the eastern Massachusetts region, the Technical Committee was confronted with the fact that site acquisition, land development, terminal facility, and ground transportation costs for a second airport would amount to hundreds of millions of dollars in public investment.

From an ideal point of view, the public investment required to provide an appropriate airport site within eastern Massachusetts would be at such a level that the full development cost (and operating cost) of such an airport could be solely financed through direct user charges and federal airport aid from direct user taxes levied upon the air transportation and related activities that were performed at the airport facility.

Ideal Site Impossible to Attain

The previous sections of this Chapter have explored the features of a second major Air Carrier Airport site to serve the eastern Massachusetts region within the context of the ideal criteria from an Aeronautical, Market, Cost and Social

Impact point of view.

It is obvious that such a potential ideal airport site does not exist within the eastern Massachusetts region.

The Technical Committee realizes that any major second airport facility located within the eastern Massachusetts region might involve a compromise of the ideal criteria discussed herein.

The Committee has utilized the four major criteria as guideline tools in an attempt to identify a reasonable and acceptable second Air Carrier Airport site.

Alternative Sites Investigated

Both the Consultant Report and various Committee members conducted a preliminary investigation of a wide variety of possible airport sites within the Eastern Massachusetts region (and adjacent areas).

The Technical Committee evaluated twenty possible second airport sites in a preliminary manner for the purpose of identifying a limited number of such sites which appeared to best coincide with the four criteria previously described in this Chapter. Once the listing of this limited number of sites (which ultimately consisted of six possible sites) had been completed, the Technical Committee undertook an intensive investigation and evaluation of these sites.

The Committee believes that the twenty sites investigated cover all of the reasonably possible airport sites that could be identified at this time.

Initial Sites Rejected

The following is a listing of fourteen airport sites considered by the Committee and subsequently rejected by the Committee as a result of preliminary evaluation.

(1) Harbor Island Airport

The Consultant Report included a discussion of the feasibility of a second airport location at the site of the Brewster Island Chain outside of Boston Harbor. The Report concluded that a major Air Carrier Airport in this location would result in very serious air traffic conflict between Boston Logan Airport and this Harbor Island Airport. This potential traffic conflict would constitute a situation where the two airports could not be operated simultaneously as both safe and efficient airline airports. In addition, there would be required very difficult and expensive construction techniques in order to install major airport runway, necessary terminal, and access facilities at this site. Finally, the Committee determined that a concentration of aircraft operations at a Harbor Island Airport would involve

the transfer of an aircraft noise impact from one group of residential areas to another group of residential areas not now seriously affected by such noise. Since the Technical Committee has postulated the continued operation of Boston Logan Airport as a major Air Carrier Airport through the forecast period, the Technical Committee has concurred with the Consultant conclusion that this site should be rejected as a major Air Carrier Airport site.

(2) Bedford-Hanscom Field

The Technical Committee concluded that a major expansion of the existing Hanscom Field to the level of a major Air Carrier Airport was not appropriate because of limited land available for expansion.

(3) Norwood Airport

The Technical Committee examined the possible expansion of the existing Norwood Airport to a major Air Carrier Airport but concluded that such expansion was unreasonable because of highly concentrated residential development surrounding this site. A potential serious air space conflict with Logan Airport under Instrument Flight Rule (IFR) conditions prevented further consideration of this site as a major Air Carrier Airport.

(4) South Weymouth Naval Airport

The Committee considered possible expansion of the existing Naval Air Station to become a major Air Carrier Airport, but dismissed this alternative because the location of a major Air Carrier Airport at this site would be incompatible with existing land uses.

(5) Marshfield - Duxbury Area

The Committee discussed location of an Air Carrier Airport in the Marshfield-Duxbury area as an alternative to the Consultant's preferred airport site recommendation. The Technical Committee has rejected this site because of serious land use conflicts between existing and anticipated development (primarily residential) and a major Air Carrier Airport facility.

(6) Carlisle Area

The Committee discussed, and then rejected, the possibility of a major Air Carrier Airport site northwest of Bedford Hanscom Field because of potential Air Traffic conflict with Hanscom Field and incompatibility with existing land use. The Technical Committee agrees that this site should be rejected for the additional reason that future regional population and development growth projections indicate that the

second major airport should not be located in the northerly segment of the region from a market viewpoint.

(7) Franklin Area

The Consultant Report recommended consideration of the Franklin area as an alternative second Air Carrier Airport site. After further investigation, the Technical Committee concluded that this was not a feasible site because of existing and proposed development in this area and because of a potential air space conflict with T. F. Green Airport in Rhode Island.

(8) Middleton Area

The Technical Committee gave preliminary consideration to the Middleton area as a major Airport site. The Technical Committee concluded that this area was not an appropriate site for a major Air Carrier Airport. This conclusion was reached because this location is significantly north of Boston when anticipated regional growth indicates that the airport should be located west or south of Boston and because a second airport facility in this location would be inconsistent with existing land use. The location of an airport in this location would also involve a significant degree of air traffic conflict with

other important airports (i.e., Lawrence, Beverly).

(9) Fort Devens - Ayer Area

The Technical Committee has rejected an airport site in this area because of substantial land use conflict and relatively poor location with regard to serving the region's air transportation market.

(10) Hopkinton-West Area

Preliminary consideration was given to a site in the Hopkinton area located west of Interstate Route 495 and south of the Penn Central Railroad (former Boston and Albany Railroad) Main Line Tracks. In view of the hilly terrain in this area which would involve expensive development costs at this site, the Technical Committee eliminated this site from further consideration.

(11) Westover Air Force Base

The Technical Committee is aware that a recent federal government decision to deactivate certain functions at Westover Air Force Base in the Springfield metropolitan area had generated some interest in the possible conversion of this extensive airport facility for commercial airline use. Such conversion would be predicated, in large part, upon the assump-

tion that this facility, used as an Air Carrier Airport, would be in the nature of a second Air Carrier Airport to serve the eastern Massachusetts region. Because the Westover Air Force Base Area is so remote from the center of the Boston metropolitan area air travel market (approximately 90 miles distant from downtown Boston), the Technical Committee strongly doubts that its use as an Air Carrier would attract a significant volume of Boston metropolitan area air passengers and, consequently, the Committee doubts that this proposal would serve as a second Air Carrier Airport for the eastern Massachusetts region. Therefore the Technical Committee concluded that another second Air Carrier site to serve the Boston area must be identified, no matter what use is made of the Westover Air Force Base site.

(12) Pease Air Force Base (Portsmouth, N.H.)

Preliminary consideration was given to possible future use of Pease Air Force Base, near Portsmouth, New Hampshire, as an Air Carrier Airport to satisfy the anticipated air passenger needs of the eastern Massachusetts region. The Technical Committee concluded that the location of this site, over 60 miles

north of downtown Boston, was not an appropriate site for a second airline airport in terms of adequately serving the Boston area air travel market. In addition, this airport is anticipated to remain in intensive military use and offers limited expansion potential.

(13) Rhode Island-Connecticut Area

The Technical Committee is aware of an alternative recommendation contained in a state of Connecticut Airport Consultant Study (Airport Facilities Plan for the State of Connecticut, Frederic R. Harris Associates, April, 1969) that consideration be given to the location of a major Air Carrier Airport in the Southeastern section of that state at the Rhode Island boundary. This area is approximately 70 miles from downtown Boston. In view of the uncertain status of the attitude of the State of Connecticut toward the airport proposal, and in view of the great distance between this proposed site and the Boston air passenger market area, the Technical Committee concluded that no serious consideration could be given to this site at this time.

of downtown Boston, and

the area is generally

consistently serving the Boston area and travel

not. In addition, this airport is anticipated to

remain an important facility with many use and other limits

expanded potential.

The proposed

the proposed

investigation conducted in the state of Massachusetts

the proposed

The proposed

Association, April, 1967, that consideration be given

to the location of a major Air Carrier Airport in

the Massachusetts section of that state and the

the proposed

the proposed

the proposed

the proposed

distance between this proposed site and the

the proposed

explained that no serious consideration

the proposed

(14) Pilgrim International Airport

Recently, the Technical Committee became aware of a proposal to locate a major International Airport in an area encompassing portions of the municipalities of Bridgewater, Halifax, Middleboro, and Plympton, as an integral part of a "new city" project in the South Kingston, West Plymouth and East Carver area. The proposed airport site has been examined by the Technical Committee and it was the conclusion of the Committee that such an airport site would be inappropriate in view of the anticipated effect upon surrounding developed (primarily residential) areas.

Alternative Sites Intensively Analyzed

Following the dismissal of the preceding fourteen airport sites, the Technical Committee agreed that a more intensive analysis of six (6) possible second airport sites should be undertaken by the Committee.

The six sites* are listed in alphabetical order as follows:

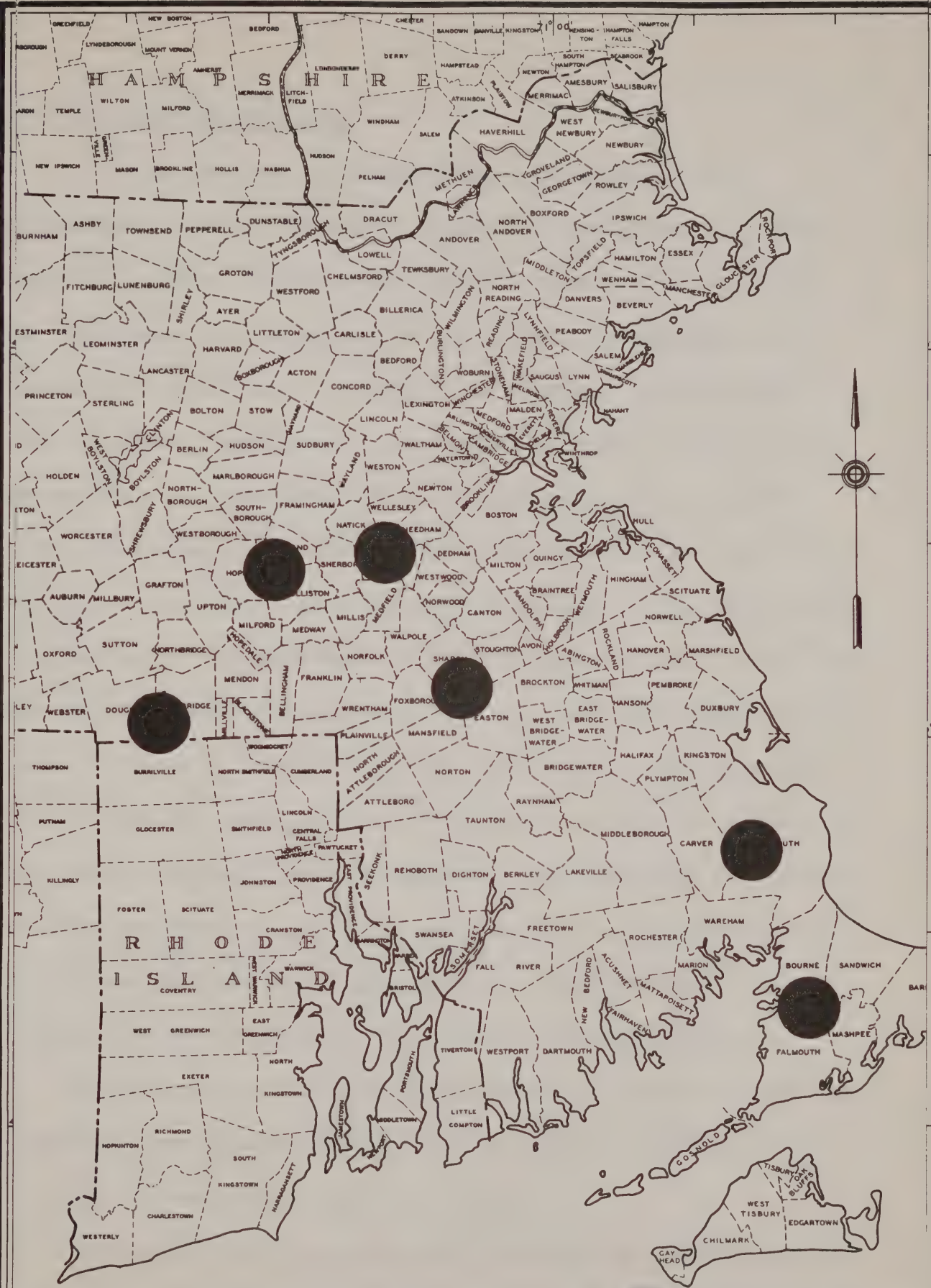
- (1) Dover
- (2) Hopkinton-East
- (3) Otis Air Force Base
- (4) Plymouth
- (5) Sharon-Easton
- (6) Uxbridge-Douglas

The Technical Committee undertook a more intensive analysis of these six sites with the objective of obtaining Committee agreement on the further elimination of as many of these six sites as possible so that the Committee could recommend to the Governor and the General Court additional detailed study of as few alternative airport sites as possible.

The result of this Committee effort was that the Committee unanimously agreed to eliminate two of the six sites from further study and the majority of the Committee agreed to eliminate an additional one of the six sites from further study.

In summary, this Committee Report recommends that three of the six sites subjected to intensive investigation be now earmarked for further detailed "in depth" investigation and evaluation.

*The map on the next page shows the general location (not specific airport boundaries) of the six alternative airport sites.



ALTERNATE SECOND AIRPORT SITE

Site Analysis Methodology

In each instance of airport site evaluation, the Massachusetts Port Authority determined preliminary airport location, runway layouts, and capital cost estimates. The FAA undertook investigation of air traffic compatibility of the airport proposal. The DPW also provided cost estimate data for some, but not all, sites and provided a preliminary description and estimated cost of probable highway system needs for alternative sites. MBTA undertook a preliminary analysis of possible rail transit facilities with comparative cost estimates in connection with the alternative airport sites. The MAC provided advice and counsel on both Air Carrier Airport and General Aviation Airport proposals. DCD concerned itself with the industrial and economic development impact of the various airport site proposals. MAPC provided assistance in terms of regional land use policies and identification of the nature and number of residential, institutional, and business units affected by the various airport proposals.

The airport development cost estimates are based upon an airport runway configuration of four 12,000' runways in two headings as generally shown in figure 2.

The access roadway system and roadway cost estimates were based on route descriptions and design criteria identified by

the DPW as the additions to regional highway system plans necessary to serve various airport sites. Appendix A of this Report shows the basis for the access roadway system costs.

In estimating the cost of rapid transit construction to the various sites, the MBTA staff did not attempt to estimate the cost of all the components involved in the construction of each individual line. Such costs would vary widely with conditions. A rough yardstick of \$5 million per mile was used for construction of conventional rapid transit, assuming no major tunnel construction, and using existing railroad rights-of-way. On the average, this should cover the costs of grading, structures, track, power and signalling, at 1969 prices. This does not include such items as land takings, cost of acquiring railroad rights-of-way, relocating railroad freight facilities, construction of intermediate stations, maintenance facilities, or vehicles.

Such costs are extremely difficult to predict without detailed study. The objective here was only to provide some idea of the comparative cost of providing rail service to the various alternate sites, and the totals were not included in the total site development costs.

In several cases, the rail transit extensions would be so long that their capital costs could probably not be justified. Airport traffic alone could not support them, and the provision

of intermediate stops would add to the cost and lengthen the trip time to the point where these routes would probably not be competitive with other modes of public transportation.

Detailed Site Analysis

All of these individual agency inputs were placed before the Committee for discussion and analysis.

The following sections of this report contain the essence of the Committee analysis of the six possible second airport sites.

Dover Area

The airport site, located in a Southwest direction from downtown Boston, would require land acquisition of approximately 12,700 acres, and land use restrictions of approximately an additional 3,300 acres, primarily within the Town of Dover, according to the airport layout developed by the MPA. This proposed site was the recommended site for location of a second Air Carrier Airport by the Consultant firm of Landrum and Brown.

(1) Aeronautical Features

At the request of the Technical Committee, the FAA undertook an extensive investigation of the air traffic compatibility of this proposed airport with other airports, particularly Logan Airport, within the region.

On November 4, 1969, the manager of the Boston Area Office

of FAA sent a letter to the Chairman of the Technical Committee, which reads, in part, as follows:

"Dover: This location also has serious airspace conflicts, and although it is slightly better than Easton, it is still unacceptable from an air traffic control standpoint. We, therefore, do not endorse this site at this time."

On the other hand, the Consultant Report had previously concluded that the Dover site was workable from an airspace point of view by means of adoption of altitude separation and vectoring of air traffic procedures.

(2) Market Accessibility

The Technical Committee concurs with the Consultant finding that this site presents a highly desirable location from an air transportation market accessibility point of view. In terms of market accessibility, this site is the best of the six possible airport sites selected for intensive analysis. This site is calculated to be 15.6 road miles from downtown Boston.

The DPW has defined the additional access road requirements as follows:

"The most logical access corridor would be a six-lane rural highway commencing approximately 2500' southwest of the interchange between Route 128 and Route 109 and traveling westerly for approximately 2500', then changing to southwesterly for an additional 6500' (approx.) where it would roughly parallel an existing roadway (Powisset Street) and travelling the remaining 2000' to the airport boundary. The total length being approximately 2.1 miles."

Rail access to this site would involve a six-mile extension of rapid transit from the end of the presently planned line to Route 128 in Needham, to Dover along the right-of-way of the Penn Central Railroad.

It should be stated that the presently planned line to Route 128 in Needham is a part of the so-called Southwest Corridor Extension, which also involves the extension of Interstate Route 95 from Route 128 to the proposed "Inner Belt" (Route 695). Construction in this corridor has been suspended pending a further study of transportation and land-use needs ordered by Governor Sargent.

(3) Development Cost

The following table shows a breakdown of the major cost elements for an airport in the Dover Area:

Land Acquisition	\$ 88,100,000
Site Grading	53,200,000
Runway Paving	20,000,000
Terminal Area	160,000,000
Utilities and Drainage	100,000,000
<u>Access Highways</u>	<u>4,500,000</u>
Total Development Cost	\$425,800,000

MBTA Conventional Rail Transit (Route 128 to site)	\$ 30,000,000
---	---------------

(4) Social Impact

A field survey of the number of dwelling units within the "In Fee" and the "Non in Fee" areas was conducted. This

field survey produced the following results:

<u>Area</u>	<u>Dwellings</u>	<u>Population</u>
"In Fee"	1450	4900
<u>"Non in Fee"</u>	<u>400</u>	<u>1350</u>
Total	1850	6250

Based upon the unacceptability of this airport site from an air traffic control point of view, as expressed by FAA, and based upon the excessively large number of persons that would be dislocated by the airport proposal, it was the unanimous conclusion of the Technical Committee that no further consideration should be given to the Dover area as a possible site for a second major Air Carrier Airport to serve the eastern Massachusetts region.

Hopkinton-East

This airport site, located to the west of downtown Boston, would be south of the Penn Central Railroad main line and Interstate Route 90 and State Route 9 between Boston and Worcester, and east of Interstate Route 495. According to the preliminary MPA layout, the site would involve approximately 13,700 acres of land to be directly acquired, and an additional 3,500 acres would require land use restrictions within parts of Hopkinton, Holliston and Ashland. This general area was suggested as a possible alternative site to the recommended Dover site in the Landrum and Brown report.

(1) Aeronautical Features

The FAA has reviewed this site from an air traffic control

point of view with the following results:

"Hopkinton: With a 4-22 and a 15-33 runway alignment at this location, there are no serious airspace conflicts. We consider this area to be well located to serve Boston and can endorse the general site."

(2) Market Accessibility

This site merits a good rating from a market accessibility point of view. The site is calculated to be 27.3 road miles from downtown Boston and is well situated to serve the Boston metropolitan area and the eastern Massachusetts region as well as the Worcester and Providence, R.I. metropolitan areas. It would also provide excellent service to the Route 495 industrial area. The DPW has analyzed the added access road requirements as follows:

"The most logical access corridor would be a six-lane rural highway commencing at the junction of Route I-495 and West Main Street in Hopkinton and traveling approximately 2.7 miles easterly to the Airport boundary."

Rail rapid transit service would necessitate the use of an upgraded Riverside Line, together with a 16-mile extension along the Penn Central right-of-way from Riverside to the airport via Framingham and Ashland.

A less frequent, but much less costly, rail service could be provided by the use of conventional trains or self-propelled cars on the existing Penn Central tracks. A short spur (3 or 4 miles) to the airport terminal site would have to be con-

structed, either from the main line tracks in Ashland, or from the Milford Branch.

A high-speed rail service between Boston, Worcester and Springfield has been proposed. If such service is ever instituted, a spur to this airport site would provide a convenient connection.

(3) Development Cost

The following is a summary of the preliminary major cost estimate elements for the Hopkinton-East airport facility proposal:

Land Acquisition	\$ 70,000,000
Site Grading	44,600,000
Runway Paving	20,000,000
Terminal Area	160,000,000
Utilities and Drainage	100,000,000
Access Highways	5,600,000
Total Development Cost	\$400,200,000

MBTA Conventional Rail Transit (Riverside to site)	\$ 80,000,000
---	---------------

The Committee is convinced that it would not be necessary to actually acquire all of the land and structures within the "In Fee" area proposed for this site. Many existing land uses and facilities within this area, such as municipal waste disposal, gasoline stations, farm land, municipal utilities, industrial and commercial uses and other similar activities could remain within the "In Fee" area as compatible with a possible new major airport facility.

(4) Social Impact

A field survey of the Hopkinton-East airport layout has yielded the following data:

<u>Area</u>	<u>Dwellings</u>	<u>Population</u>
"In Fee"	950	3100
<u>"Non in Fee"</u>	<u>700</u>	<u>2300</u>
Total	1650	5400

This site is free of air traffic conflict and presents an attractive location based upon its ability to serve the air transportation market and to encourage economic development of the Route 495 area.

It was the finding of the Technical Committee that this site should be recommended to the Governor and to the General Court as a site requiring further extensive detailed study as a possible location for a second major commercial airport.

Otis Air Force Base

The possible use of Otis Air Force Base on Cape Cod as a Second Air Carrier Airport to serve the eastern Massachusetts region has been proposed by the Massachusetts Aeronautics Commission. Otis Air Force Base is located in a southeast direction from downtown Boston.

An entirely new runway configuration would be required at Otis Air Force Base if this site is to be developed as a major Air Carrier Airport.

(1) Aeronautical Features

The FAA has submitted the following comments relative to

air traffic control considerations at this site:

"The Otis site does meet air traffic control airport compatibility criteria and is acceptable from an airspace standpoint as the location for the second major airport to serve the Boston metropolitan area."

(2) Market Accessibility

The site is poorly located in relation to the Boston metropolitan area and eastern Massachusetts regional population center and air travel market. The site is calculated to be 64.1 road miles from downtown Boston. The site is also remote from the market areas of Providence, R.I. and the northern and western parts of the eastern Massachusetts region.

DPW has submitted the following comments regarding additional highway access to this site:

"For the proposed facility at Otis, there are two (2) logical access corridors.

The first logical corridor would utilize the existing access road at the Otis Exit 2 of Route 28. The use of this road would involve the widening of the existing pavement from the junction of Route 28 to the airport boundary. The estimated cost of right-of-way and construction is estimated to be not less than \$500,000.

The second logical corridor would commence at Exit 2 of Route 6 and (junction of Route 130) traveling approximately .5 miles southwesterly of the airport boundary."

In the opinion of the MBTA, to construct a super high-speed rail line from Boston to the Otis site, which would give

a reasonable trip time of, say 30 or 40 minutes, would be totally unfeasible, considering the limited market that could be served. Even conventional rapid transit would require a 52 mile extension from Braintree on the new South Shore line, and a new bridge over the Cape Cod Canal. The trip time for such a line would be about one and one-half hours from Boston to Otis and would not be attractive for airport patrons.

(3) Development Cost

A preliminary development cost estimate was made for this site according to the following summary:

Land Acquisition	Unknown
Site Grading	\$ 15,000,000
Runway Paving	20,000,000
Terminal Area	160,000,000
Utilities and Drainage	90,000,000
<u>Access Highways</u>	<u>1,500,000</u>
Total Development Cost*	\$287,000,000

MBTA Conventional Transit (Braintree to site)	\$290,000,000
--	---------------

The land acquisition cost for this site is uncertain because the bulk of this site is owned by the Commonwealth of Massachusetts and is under long-term lease to the U. S. Government. It is not known if, or when, or under what conditions, and for what level of cost, this site would become available for possible development as a major Air Carrier Airport. The U. S. Air Force facilities data indicate that

*Not including land acquisition cost

the value of the Otis Installation is \$112,274,000.

(4) Social Impact

The preliminary field survey of the number of dwelling units and persons that would be affected by the Otis Airport proposal disclosed the following results:

<u>Area</u>	<u>Dwellings*</u>	<u>Population</u>
"In Fee"	200	600
"Non in Fee"	300	950
Total	500	1,550

Based upon the data available, it was the conclusion of the majority of the Committee that this site should receive further detailed study as a possible second major Air Carrier Airport to serve the eastern Massachusetts region.

Plymouth Area

The proposed Plymouth site is located to the southeast of downtown Boston. The airport layout assumed would require approximately 12,750 acres of land for land acquisition and would involve an additional 3,900 acres to be in a restricted use category.

*It should be noted that of the 200 dwelling units counted within the "In Fee" area, the overwhelming majority of such units are housing for military personnel associated with the function of the military reservation. These military housing units include 70 trailers and 127 permanent units accounting for 580 persons.

(1) Aeronautical Features

The FAA has commented upon the feasibility of the Plymouth site with the following language:

"Plymouth: An analysis of the proposed Plymouth site indicates that with the proper runway configuration, there would be no serious problem from an air traffic standpoint."

(2) Market Accessibility

This site is not particularly well located in relation to the Boston metropolitan area and eastern Massachusetts regional population center and air travel market. This site is calculated to be 45.4 road miles from downtown Boston. Although this site could provide good access to the southeastern Massachusetts area, it would not provide suitable access to the northern or western parts of the eastern Massachusetts region.

The DPW staff has commented upon added highway requirements for this site as follows:

"The most logical access corridor would be a six-lane rural highway commencing at Exist 39 of Route 3 and traveling southeasterly for approximately 1.8 miles to the Airport boundary."

For rail rapid transit, the MBTA staff assumed use of the new South Shore Line to Braintree, with a thirty-mile extension from Braintree to Plymouth via the Old Colony right-of-way through South Weymouth, Abington, Whitman and Kingston.

Such a long transit extension probably could not attract sufficient riders to justify its cost.

(3) Development Cost

The following cost estimates for this possible airport site have been prepared:

Land Acquisition	\$ 14,200,000
Site Grading	9,500,000
Runway Paving	20,000,000
Terminal Area	160,000,000
Utilities and Drainage	100,000,000
<u>Access Highways</u>	<u>3,750,000</u>
Total Development Cost	\$303,700,000

MBTA Conventional Rail Transit (Braintree to site)	\$150,000,000
---	---------------

As in the case of the Hopkinton-East site, the Committee does not believe that it would be necessary to acquire the entire land area within the "In Fee" boundaries in view of the fact that substantial portions of this area includes Cranbury bogs and state park land which could remain in their current use after a major airport had been developed.

(4) Social Impact

A field survey produced the following results:

<u>Area</u>	<u>Dwellings</u>	<u>Population</u>
"In Fee"	60	200
<u>"Non in Fee"</u>	<u>50</u>	<u>150</u>
Total	110	350

Of major and critical concern, however, is the possible impact of such a major airport facility upon the Miles Standish

State Park operated by the Massachusetts Department of Natural Resources. This potential impact must be the subject of further detailed investigation prior to any decision on this airport site possibility. It was the unanimous conclusion of the Technical Committee that this airport site warranted further intensive consideration.

Sharon-Easton Area

The airport site is located almost directly south of downtown Boston. The site would involve acquisition of approximately 11,500 acres and require land use control of an additional 3,700 acres. The Consultant Report identified this site as a strong "second choice" alternative to the Dover area site.

(1) Aeronautical Features

The FAA staff has submitted the following comments:

"Easton (Sharon): This location has serious airspace conflicts with Logan International Airport. We consider it unacceptable from an air traffic control standpoint, and, therefore, do not approve the site."

(2) Market Accessibility

This site merits a very good rating from a market accessibility point of view. This site is calculated to be 19.8 road miles from downtown Boston and is well located in relation to many parts of Boston metropolitan area and the eastern Massachusetts region. The DPW has outlined the

added highway needs for this site in the following language:

"The most logical access corridor is a six-lane rural highway commencing at Exit 29 of Route 95 (Foxborough) and traveling southeasterly approximately 5.5 miles to the airport boundary."

Secondary access, by means of special railroad service connecting the airport facility with the proposed MBTA Southwest Corridor rapid transit extension to Route 128, via the Penn Central's Boston to Providence main line, could be accomplished with relatively little difficulty. A three-mile spur from this main line to the airport terminal would provide a convenient connection with any high-speed Boston to New York rail service that may be established in the future.

(3) Development Cost

The following development cost summary for the Sharon-Easton site has been prepared:

Land Acquisition	\$ 42,000,000
Site Grading	22,000,000
Runway Paving	20,000,000
Terminal Area	160,000,000
Utilities and Drainage	100,000,000
Access Highways	<u>11,400,000</u>
Total Development Cost	\$355,400,000

MBTA Rail Transit (Branch from Penn Central Main Line)	\$ 9,000,000
---	--------------

(4) Social Impact

The field survey of the Sharon-Easton airport layout has resulted in the following information:

<u>Area</u>	<u>Dwellings</u>	<u>Population</u>
"In Fee"	800	2,800
<u>"Non in Fee"</u>	<u>150</u>	<u>500</u>
Total	950	3,300

Based upon the firm position of the FAA that the Sharon-Easton site is unacceptable from an air traffic control point of view, and based upon the unacceptably large number of people that would be affected by a major airport in this area, it was the unanimous conclusion of the Technical Committee that the site should be eliminated from any further consideration as a potential second Air Carrier Airport site.

Uxbridge Area

This airport site, located southwest of downtown Boston, would involve acquisition of 13,700 acres, and would require land use limitations for an additional 3,900 acres. A portion of this site would be located within the state of Rhode Island.

(1) Aeronautical Features

The FAA comment on the feasibility of the Uxbridge site is as follows:

"Uxbridge: An analysis of the proposed Uxbridge site indicates that a runway configuration of 4-22 and 15-33 is unacceptable due to serious air traffic complications with T.F. Green State Airport in Rhode Island. A runway configuration of 4-22 and 9-27 produces a site that would be compatible with other airports as well as the enroute air traffic system."

(2) Market Accessibility

As in the case of the Plymouth airport site, this location

is not particularly well located relative to the Boston metropolitan area population center and air transportation market when compared to the Dover, Sharon and Hopkinton area sites. This site is calculated to be 42.8 road miles from downtown Boston. This site is well located to serve the Providence, R. I., market area and the western parts of the eastern Massachusetts region as well as the Worcester metropolitan area.

The DPW has reviewed the additional highway access needs for this site with the following results:

"The most logical access corridor would be a six-lane rural highway commencing at Exit 8 of Route 495 and roughly paralleling Route 16 for approximately 11.5 miles southwesterly to the airport boundary."

The MBTA advises that this site could be served by a 31-mile extension of rapid transit service from Route 128 in Needham via the same Route considered for the Dover site, but continuing along the former New Haven Railroad right-of-way from Dover via West Medway to Uxbridge. In this case, some 15 miles of new right-of-way would be necessary. As in the case of the Otis and Plymouth sites, such a long extension of rail rapid transit probably could not be justified.

(3) Development Cost

In accordance with the layout of this proposed air-

port site, the following preliminary cost estimates have been developed:

Land Acquisition	\$ 13,900,000
Site Grading	43,500,000*
Runway Paving	20,000,000
Terminal Area	160,000,000
Utilities and Drainage	100,000,000
Access Highways	23,000,000
Total Development Cost	\$361,400,000

MBTA Conventional Rail Transit (Route 128 to site)	\$155,000,000
---	---------------

(4) Social Impact

The MAPC field survey of the Uxbridge area airport layout yielded these results:

<u>Area</u>	<u>Dwelling</u>	<u>Population</u>
"In Fee"	200	700
"Non in Fee"	400	1,300
Total	600	2,000

The Technical Committee has received a preliminary reaction from State of Rhode Island Planning and Aviation officials expressing concern relative to the possible impact of a major airport in this location upon a proposed watershed development plan recommended by the Statewide Planning Program Office.

It was the conclusion of the Technical Committee that the relatively remote location and questionable economic feasibility of this alternative airport site should result in the dismissal of the site from further consideration.

*This cost is based upon a 4-22 and 15-33 runway heading configuration. Site grading and off-site grading costs would

Market Potential of Alternative Sites

Since the market potential characteristics of a major airport site are of such importance, the Consultant undertook an analysis of the market potential of the six alternative sites intensively analyzed by the Committee.

The Committee agreed that the results of this analysis should be included in this report for information purposes, but with the caveat that the Committee has neither approved nor disapproved the assumptions, the methodology, or the findings of this analysis.

A basic assumption in the Consultant's analysis was that there would be no capacity restraint at Logan Airport and that there would be no artificial or arbitrary restraints upon the character and extent of Air Carrier aircraft operations at Logan Airport during the forecast period.

It is the opinion of the Committee that the Consultant's estimate for enplaned passengers in the 1968 Consultant Report, and in this new analysis, are conservative.

This new airport market potential analysis is presented at the end of this Report as Appendix B.

Summary of Committee Recommendations

In summary, the preceding analysis has led the majority of Technical Committee to the two following recommendations:

- (1) The Technical Committee recommends to the Governor and to the General Court of the Commonwealth of Massachusetts that no further consideration should be given to the possible location of a major Air Carrier Airport in the Dover area, the Sharon-Easton area, or the Uxbridge area.
- (2) The Technical Committee recommends to the Governor and to the General Court of the Commonwealth of Massachusetts that additional study be undertaken of, and careful consideration be given to, the possible location of a major Air Carrier Airport in the Hopkinton area, the Plymouth area, and the Otis Air Force Base area.

The FAA abstains from these two policy recommendations since it is the FAA policy to regard the selection of an airport site as a matter of state and local responsibility.

CHAPTER IV

SUPPLEMENTARY AIRPORT SYSTEM

Definition

Smaller airports have been historically described as General Aviation Airports in order to indicate that such airports do not serve scheduled airline operations performed by the Air Carrier Corporations certified by the CAB. Scheduled airline service performed by aircraft of less than 12,500 lbs. does not require CAB certification nor are such operations subject to economic regulation by CAB. "Supplementary Airport" is used within the context of this report rather than the term "General Aviation Airport" since such airports may be appropriate for operation of scheduled airline service utilizing larger aircraft in excess of 12,500 lbs. at some point during the forecast period.

Introduction

The Department of Transportation, Air Traffic Control Advisory Committee, forecasts a national growth in general aviation activity from 84 million annual operations in 1968 to 167 million in 1980 and 448 million in 1995. In Chapter II it was assumed that Boston Logan International Airport would accommodate approximately 100,000 total non air carrier operations in the future. This assumption was made in order to provide a relatively stable mix of heavy aircraft to maximize Logan's

capacity. In order for Logan to limit its general aviation operations and have this assumption become a reality, it will be necessary to provide additional facilities in the Boston system that will not only attract general aviation operations from Logan, particularly during peak hours, but also provide for the natural growth of general aviation in the area. This chapter deals with these problems and their solutions.

Present system

The present system of airports within the Route 495 area of Boston consists of seven publicly owned airports and three privately owned airports. All contribute to the airport system and presently handle annually an estimated 1,000,000 general aviation landings and takeoffs. Except for Logan, all of the airports are essentially single runway systems.

It is estimated that with air traffic control the present total annual capacity of all of these airports would be:

Boston - Logan	330,000
Bedford	290,000
Norwood	220,000
Beverly	220,000
Marshfield	220,000
Mansfield	220,000
Tewksbury	220,000
Marlboro	220,000
Lawrence	220,000
<u>Hopedale</u>	<u>220,000</u>
TOTAL	2,380,000

Consultant Report Recommendations

The Consultant report has identified a need to provide vastly expanded airport capacity to handle anticipated growth in non-air carrier operations within the Boston metropolitan area.

The consultant report recommended the expansion of four existing non-air carrier airports and the creation of four additional airports (including the proposed Dover Southwest Airport) to become available for supplementary use within the Boston area. As discussed previously, the consultant report also anticipated vastly increased general aviation operations at Boston-Logan Airport during the forecast period.

The following table indicates the future airport system that would be available for use by general aviation operations during the forecast period, as recommended by the consultant:

<u>Airport</u>	<u>Type*</u>	<u>Status</u>
Logan	IFR	Existing
Dover	IFR	New
Beverly	IFR	Existing
Bedford	IFR	Existing
Norwood	VFR	Existing
Weymouth	VFR	Existing
Reading	VFR	New
Weston	VFR	New
Hingham	IFR	New

*IFR - Instrument Flight Rules

VFR - Visual Flight Rules

Technical Committee Reaction

As is the case of the location of a second air carrier airport to serve the Boston metropolitan area, general aviation interests must be prepared to accept airport site locations which are less than ideal from a user accessibility point of view.

Insofar as the Boston Metropolitan area is concerned, airports such as the Lawrence Municipal Airport (25 road miles from Boston-Logan Airport) and the Worcester Municipal Airport (45 road miles from Boston-Logan Airport) must be considered as available to satisfy part of the demand for general aviation operations generated by the Boston Metropolitan area.

In the final analysis, there is a question of how far the land resources of the Boston Metropolitan area and the Eastern Massachusetts region should be expended to meet the supplementary airport demands, when some significant portion of any unmet demand would have minimum adverse effects upon the economic welfare of the metropolitan area. Based on the forecast of aviation growth within the Boston area, the Committee concludes that it is important to provide substantial additional airport capacity within the metropolitan area and areas adjacent to the metropolitan area to meet additional general aviation growth during the forecast period.

The Technical Committee is of the opinion that new airports of the type recommended by the consultant in Reading, Weston and Hingham should not be constructed in these areas because a review indicates that no appropriate sites exist in such areas. The Committee has also assumed that general aviation operations at Boston-Logan would be stabilized at a minimum level during the forecast period as previously mentioned.

Also of concern to the Committee is the Consultant's forecast of approximately 3,159,000 general aviation aircraft operations by the year 1990 within the Boston area. Forecasts by the FAA for the Boston Hub for 1980 indicate 2,127,000 general aviation operations. The DOT's Air Traffic Control Advisory Committee report estimates a five-fold increase in general aviation movements nationally by 1995. Assuming Boston's growth rate would be parallel to the National growth rate, the Committee considered that it should plan for an airport capacity of approximately 4,200,000 general aviation operations by 1990.

The Committee recognizes the need for an adequate system of airports within the eastern Massachusetts region to serve the forecast demand. The Committee also agrees with the Consultant that, insofar as possible, existing airports should be expanded to accommodate general aviation growth and, where practical, new additional airports should be constructed to meet anticipated demand growth.

Technical Committee Program

The Technical Committee considered the Supplementary Airport system recommendations developed by the FAA National Airport Plan and the MAC Massachusetts Airport Plan of 1969.

An analysis of these two regional airport recommendations shows a large degree of general agreement and consistency as to the number and location of supplementary airports within the Eastern Massachusetts region.

The following is the recommended total airport system showing the ultimate capacities of each of the airports by 1990:

<u>Location</u>	<u>PANCAP</u>	<u>Recommendation</u>
Boston-Logan	750,000	Expanded
Bedford	500,000	Expanded
Weymouth	500,000	Expanded
Beverly	500,000	Expanded
Norwood	400,000	Expanded
Marshfield	500,000	Expanded
Marlboro Area	500,000	New Airport
Hopkinton Area	500,000	New Airport
Lawrence	500,000	Expanded
Mansfield	500,000	Expanded
Newburyport Area	500,000	New Airport
Lowell Area	<u>500,000</u>	New Airport
	6,150,000	

The anticipated 1990 forecasted demand for Air Carrier and General Aviation aircraft operations has been estimated at the 4,700,000 annual level. Consequently, this recommended airport system would provide a comfortable margin of capacity (6,150,000 annual operations) in excess of the 1990

demand forecast.

The following assumptions or facts were utilized in the development of the above system:

- (1) Boston-Logan Airport and one (or more) of the Supplemental airports would be required to handle the Air Carrier demand during the forecast period.
- (2) The PANCAP of 750,000 annual operations at Boston-Logan Airport represents the operational flexibility inherent in the Logan Airport maximum expansion program described in Chapter II.
- (3) Bedford-Hanscom Airport would be expanded to provide a dual set of parallel runways of appropriate length to maximize capacity. Overflow Air Carrier operations would be anticipated at Hanscom Airport for short-haul airline trips such as within for Northeast Corridor.
- (4) Weymouth, Beverly, Marshfield, Lawrence and Mansfield airports would be expanded with dual sets of parallel runways of appropriate length.
- (5) Norwood Airport would be expanded to include a single set of parallel runways of appropriate length.
- (6) Hopkinton Airport would initially have parallel runway systems in two directions of approximately 5,000' in length.
- (7) New Supplementary airport locations in the Marlboro, Newburyport and Lowell areas would ultimately have parallel runway systems approximately 5,000' in length to maximize capacity. Crosswind runways would be installed if necessary. Detailed site investigation and study would be required within each of these general locations in order to determine the future role of these proposed airports.
- (8) The development recommended at each of the supplementary airports is subject to more intensive study, and detailed planning and, therefore, each of the capacities may require adjustment.

- (9) All supplementary airports have Instrument Flight Rule (IFR) capability in order to maximize the capacity of the system.
- (10) All supplementary airports are to be equipped with as high a degree of navigational aids as possible in the interest of safe and efficient operation.
- (11) All new airports are to be located and operated so that any adverse impact on adjacent land use is minimal.
- (12) In the event that any significant aircraft operating conflict between any supplementary airport and any major Air Carrier airport should develop, then such conflict should be resolved so that there is no compromise to the efficiency and safety of aircraft operations at the major Air Carrier airport. Such resolution of existing or potential aircraft operations conflict could lead to aircraft operating rule restrictions at affected supplementary airports.

Chapter V

ORGANIZATIONAL PROGRAM

Existing Program Responsibility

Within the eastern Massachusetts region* there are generally two types of public agencies which are responsible for publicly owned airport operation planning and development. Such agencies are commonly called an "Airport Operator."

The first type of organization is the Massachusetts Port Authority which, under special state legislation (Chapter 465 of the Acts of 1956), is charged with the responsibility for operation and development of Boston Logan Airport and Hanscom-Bedford Airport.

The second type of organization is the municipal airport commission which, under Chapter 90 of the Massachusetts General Laws, is charged with the establishment, operation and development of airports within a city or town. Chapter 90 also provides that two or more cities and towns may form a joint airport commission to establish, operate, and develop an airport. All other airports, with the exception of military and privately owned airports, within the eastern Massachusetts region are

*For the purposes of this Report, the eastern Massachusetts Region is defined as the 152 Cities and Towns within the Commonwealth of Massachusetts which comprised the study area for the Eastern Massachusetts Regional Planning Project (EMRPP). A map of the EMRPP Area is shown on the next page.

[illegible]

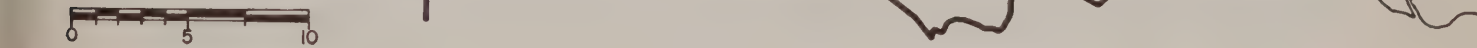
NEW HAMPSHIRE

RHODE ISLAND

PLAINVILLE

BRIDGEWATER

HALIFAX



SCALE IN MILES

operated under the jurisdiction of a municipal airport commission type of organization.

Program Responsibility in Other Areas

In other states, administrative units of state government are often responsible for the establishment and operation of publicly owned airports within a metropolitan area, a region, or a state. In New England, for instance, the Rhode Island Division of Aeronautics owns and operates all public airports. In Connecticut, the Bureau of Aeronautics owns and operates Bradley Field, Groton, Danielson, Waterbury, Brainard, and Oxford. In Maine, the Maine Aeronautics Commission owns and operates Augusta and has assumed the total state and local responsibility for capital improvement costs at the Portland airport. In New Hampshire, the Aeronautics Commission owns and operates the Rochester airport. In Vermont, the Aeronautics Board owns and operates all public airports in the state except Burlington.

In other cases, county government is responsible for airport operation and development, such as Dukes County in Massachusetts and Wayne County (Detroit) in Michigan.

Many major Air Carrier Airports serving the other major urban regions of the continental United States are the direct responsibility of municipal government. The major Air Carrier

airports serving Chicago, Philadelphia, Los Angeles, San Francisco, Baltimore, St. Louis, Atlanta and New Orleans are operated by the municipal government.

The Washington, D. C. area airports (National Airport and Dulles Airport) constitute a special case in that these are the only two major Air Carrier Airports directly operated by the Federal government through the FAA organization.

The New York City metropolitan major Air Carrier Airports (Kennedy, La Guardia and Newark) also constitute a special case wherein a bi-state, multi-purpose revenue bond Authority, The Port of New York Authority (PNYA) operates these airports. The Massachusetts Port Authority closely resembles the Port of New York Authority in terms of governmental organization, with the major difference that the MPA is the creation of one state (Massachusetts) in contrast to the PNYA, which was created by compact of two states (New York and New Jersey). The PNYA bi-state compact required the enactment of a special federal law by the Congress authorizing the compact. The PNYA has been in existence as an organization since 1921, although it did not become involved in airport operation and development until shortly after World War II.

Second Airport Management

This Committee report has presented preliminary alternative

sites which are identified as suitable for further investigation for development as a second major commercial airport to serve the eastern Massachusetts region and adjacent portions of the New England area.

Much additional detailed engineering and cost analysis is required before a final decision can be rendered that a specific site is feasible from a physical, operational, economic, and environmental point of view. Such additional detailed investigation should be undertaken immediately by an appropriate state government body.

Any second major Air Carrier Airport facility located within the eastern Massachusetts region should have the same airport operator management as Boston Logan Airport because of the mutual interdependence of function and finances that would exist between Logan Airport and such a major second airport.

The Massachusetts Port Authority, as the successful airport operator of Boston Logan Airport, already possesses the management skills and experience in airport planning, operation, development and financing, which are essential to the successful development and operation of a two Air Carrier airport system within eastern Massachusetts.

Site Investigation Responsibility

The Massachusetts Port Authority must be deeply involved in the second airport site investigation and selection process by virtue of its airport management experience, expertise, and responsibilities.

Under current state law, the Massachusetts Port Authority does not possess the legal right or responsibility to select, acquire, develop and operate any new major Air Carrier Airport within the Commonwealth of Massachusetts.

It could be recommended that the Massachusetts Port Authority be assigned the task of conducting all of the remaining detailed investigations, select a final airport site, acquire the appropriate land area, and develop and operate the second major Air Carrier Airport.

An alternative policy is to assign the final detailed investigation, site selection, and land acquisition responsibilities to another state agency or to a specially created state commission. This alternative policy has merit because the decision to select a specific major airport site is a highly sensitive and intensely controversial matter which involves many non-transportation and non-financial factors, such as regional land use policies and environmental impact consequences. The location of a second major Air Carrier Airport is a matter of such importance and

magnitude that the site selection procedure should now be more directly the responsibility of the Executive Branch of state government.

The Committee is cognizant of the fact that legislation was enacted last year (Chapter 704 of the Acts of 1969) authorizing the creation of a Governor's Cabinet as the initial phase of a comprehensive reorganization of the Executive Branch of state government. Among the Cabinet posts created was that of Secretary of Transportation and Construction.

It would have appeared appropriate to involve this new Executive Office of Transportation and Construction in the site investigation of the location of a possible second major Air Carrier Airport. Under the terms of Chapter 704, however, the provisions of the initial phase of the reorganization program will not become effective until April 30, 1971.

Site Selection Commission Recommended

It is recommended that a special Airport Site Selection Commission be created for the purpose of conducting a final detailed evaluation of alternative sites, of establishing the identification of a selected specific site, and, finally, of recommending preservation (including such land acquisition as may be necessary and desirable) of the selected site for possible ultimate use as a second major Air Carrier Airport.

This Special Commission, which might consist of seven unpaid members, should be authorized by the Massachusetts General Court and appointed by the Governor.

The Commission membership should include representation from the Massachusetts Port Authority, the air transport industry, the business community, involved public agencies and representatives of the general public interest.

The Commission should be given appropriate financing and staff assistance. The Commission should be given a definite time schedule and it should be charged with the preparation of two reports for submission to the Governor as follows:

(1) Report of Final Feasibility Studies, including,

but not limited to, findings, regarding preliminary engineering, air and ground transportation requirements, land use compatibility, relocation requirements, economic development implications, costs and revenues and environmental impact for three alternative airport sites.

(2) Report of Final Airport Site Selection, including,

but not limited to, a land acquisition and land easement program which recommends an organizational method to preserve one of the three alternative sites for possible ultimate airport use, a financial method to

accomplish the land preservation, and a specific schedule to provide for the preservation of the airport site.

Upon submission of these two reports to the Governor, the life of the Commission would automatically be terminated since its assignment would have been completed.

It is recommended that the Governor act within sixty days from the formal receipt of the Commission's Reports by choosing to approve one or none of the three alternative sites recommended by the Commission. The Governor would effect his decision through written notification to the Office of the Secretary of State of the Commonwealth within the sixty day period. It would be anticipated that the Governor would subsequently file a special legislative message with the General Court recommending the appropriate legislation to guarantee preservation of the site approved by him.

It is possible that the Governor may find that none of the three alternative sites to be acceptable, in which case he would so notify the Office of the Secretary of State within the sixty day period. In such an eventuality, the search for a second major airport site within the Commonwealth of Massachusetts should be abandoned since it would then be apparent that no major second Air Carrier Airport location within the state is acceptable

to the state government. This possible series of events may indicate the need for the state government to seek a cooperative effort with one or more neighboring states within eastern New England in an attempt to identify a major airport site in another state.

Members of the Technical Committee are confident that an acceptable second major airport site can be found within the Commonwealth of Massachusetts.

It is absolutely necessary that the proposed airport site selection Commission be given the necessary personnel, funds, and expert assistance needed to accomplish its mission within a reasonable period of time. The sum of \$200,000 and a twelve month period between activation of the Commission and submission of its recommended reports to the Governor is reasonable in view of the work already accomplished to date by the agencies represented on the Technical Committee.

The following scheduled sequence of events is recommended:

<u>Date</u>	<u>Action</u>
August 1, 1970	Special Airport Site Land Preserve commission authorized and funded by the General Court and appointed by the Governor.
August 1, 1971	Deadline for submission of two Commission Reports to the Governor. Life of Commission terminated.
October 1, 1971	End of sixty day period for approval by the Governor of one or none of the three sites recommended by the Commission.

Under this proposed schedule of events, a decision can be made by the state government during the 1971 legislative session as to the location of a second major Air Carrier Airport within the Commonwealth of Massachusetts.

It is anticipated that the Massachusetts Port Authority would continue to carry out its responsibilities with regard to Logan Airport.

Supplementary Airport System

This report has identified the need for substantial added airport capacity to serve General Aviation type of aircraft operations within the eastern Massachusetts region. This capacity increase will be required irrespective of the decision to where to build (or not to build at all) a second major Air Carrier Airport within eastern Massachusetts.

Within the eastern Massachusetts region, the Massachusetts Aeronautics Commission has the basic responsibility for planning the location and approving the operation of all public civilian airports other than Logan and Bedford Airports under the jurisdiction of the Massachusetts Port Authority. The Aeronautics Commission also administers the 50% federal and 40% state aid available for eligible capital improvements. However, the initiative for development and operation of such airports is vested in county, city or town airport commissions, which operate as a division of municipal government.

General aviation type of supplementary airports are essentially regional facilities and are integral parts of a regional system of airports. While the original concept that such airports were appropriately the responsibility of local municipal government may have been valid in past years, the expansion of aviation activity and the airport requirements for faster and more complicated type of aircraft, together with the inability of municipal government to undertake the financial burden of airport development, has rendered the original concept inadequate to meet present and future needs for supplementary airport development.

There is the necessity to formulate a new administrative and financial program to ensure that an appropriate system of general aviation type airport facilities are developed for the eastern Massachusetts region.

While existing airport operator organizations are to be encouraged to retain the traditional responsibilities of airport preliminary engineering, development, operation, and regulation, it will be necessary to foster a supplemental airport program which is planned in detail, financed, and implemented during the forecast period. This means that the Massachusetts Aeronautics Commission must be given greater responsibility, authority and financial resources, in order to provide greater assurance that an adequate supplementary airport system is developed within eastern Massachusetts.

Eastern Massachusetts Airport Construction Program

The Massachusetts Aeronautics Commission should be authorized to publish a new five-year Eastern Massachusetts Airport Construction Program in order to determine the specific supplementary airport projects which should be undertaken within the eastern Massachusetts region. The Committee recommends that an appropriation of \$75,000 be authorized by the General Court during the 1970 session to finance the preparation of such a supplementary airport construction program for presentation to the Governor and General Court by August 1, 1971. It is anticipated that additional federal funds will be available to finance the preparation of the program in accordance with pending federal airport legislation. The August 1, 1971 Program submission to the Governor and General Court would be accompanied by a specific legislative request for appropriation of state funds to carry out the Supplementary Airport Construction Program.

Program Incentives Necessary

The Committee recognizes that new incentives will be necessary to encourage the implementation of the Construction Program within the eastern Massachusetts area. Several types of new incentives were considered whereby existing Supplemental Airports could be expanded and new Supplemental Airports could be created. During these deliberations, the Committee reviewed the state-wide airport development program authorized by the State of Vermont in

1967. Under the "Vermont Plan" the state government undertook the organizational and financial responsibility of constructing new airports and the state government offered to assume the organizational and financial responsibility of existing publicly owned municipal airports whenever the municipal government agreed to transfer the airport to the state government. As a result of this program, the state has constructed four small airports and is starting a fifth one this spring. During the same period, the state has received from the former owners the Bennington, Springfield, Rutland, Middlebury, Barre-Montpelier and Newport airports.

The Committee recommends that the general principles of the "Vermont Plan" be adopted in order to provide the needed Supplementary Airport Capacity within the eastern Massachusetts region.

Expansion of Existing Supplementary Airports

In the case of expansion projects identified in the Eastern Massachusetts Airport Construction Program, the municipal government could elect to undertake the expansion project itself, with the full project cost assumed by the state government. In the alternative, the municipal government could seek a transfer of the airport facility to the state government for direct state operation of the airport. Under either alternative, the decision-making power relative to airport expansion would remain the prerogative of the local municipal government.

It is anticipated that the Massachusetts Port Authority would continue to be the Airport Operator and would finance and carry out the recommended development program for Bedford Hanscom Airport.

Creation of New Airports

In the case of proposed new Supplementary Airports identified in the Eastern Massachusetts Airport Construction Program where no municipal airport Commission was in existence, the municipality(s) could either elect to create an airport commission to initiate development of the new airport with the full cost assumed by the state government, or, failing such action, the new supplementary airport could be directly developed by state government through the Massachusetts Aeronautics Commission.

Chapter VI

FINANCIAL PROGRAM

Sources of Revenue

There are four basic sources of revenue by which Air Carrier and General Aviation Airport planning, operation and development activities are financed within the Commonwealth of Massachusetts.

These four revenue sources are identified as follows:

- (1) User Charges
- (2) Federal Tax Funds
- (3) State Tax Funds
- (4) Municipal Tax Funds

(1) User Charges

This source of revenue is in the form of rentals, fees, and charges imposed upon the direct user of the airport facility. For the past eleven years, since February, 1959, the Massachusetts Port Authority has financed the operation and development of Boston Logan Airport from Authority facility user charge revenues almost exclusively. A relatively modest level of federal aid (\$10,000,000) was provided for Logan Airport development during this period.

The Massachusetts Port Authority was created by an act of the Massachusetts Legislature and implemented in 1959. Under the Enabling Legislation, the Authority was constituted as a public instrumentality and the exercise of the powers conferred on it under the Act were held to be the performance of an essential

One of the principal objectives in the creation of the Port Authority was to relieve taxpayers of the Commonwealth of large annual deficits that were being incurred by the State in operating Logan Airport; and, more important, to allocate the huge sums needed to provide the capital program necessary to develop Logan to meet rapidly increasing demands for air transportation in Eastern Massachusetts. The State's operating deficits in the nine years and eight months prior to the Authority's assuming responsibility for Logan Airport amounted to more than \$30,000,000. In addition, legislation authorizing the construction of three new hangars estimated at a construction cost of \$10,000,000 had been passed but no funds were ever appropriated to provide these facilities and other needed capital improvements.

As one of its functions, the Authority assumed responsibility for development and operation of Logan International Airport. Title to the airport properties were vested in the Authority upon the payment by the Authority to the State Treasurer of \$20,972,152, which constituted the outstanding indebtedness of the State incurred in developing Logan Airport under the previous State administration. The airport properties acquired by the Authority in 1959, and all improvements completed and planned by the Authority, are currently valued at an amount in excess of \$500,000,000. These properties will be returned to the Commonwealth when all Port Authority bond indebtedness has been fully amortized.

(2) Federal Tax Funds

The Federal government has been providing federal financial assistance from general fund revenues for airport development under the Federal Airport Act of 1946. During recent years, this federal aid program has provided a minimal level of financial assistance for airport development, generally within a \$30,000,000 to \$50,000,000 total national annual disbursement.

The Congress has enacted, and the President has signed into law on May 21, 1970, a new federal airport aid program which substantially increases the level of annual airport aid funds and also increases certain aviation user taxes to provide most of the funds to finance the new airport aid program.

(3) State Tax Funds

The Commonwealth of Massachusetts currently provides a modest state financial assistance program for airport projects initiated by local airport commissions. The Massachusetts Port Authority has not received any State aid under this program, nor is it contemplated that it will in the future. These funds are obtained from the state capital outlay program, which is financed from state general fund revenues. The state general fund annually receives a modest level of tax revenue from aviation activities.

(4) Municipal Tax Funds

Municipal Airport Commissions must finance any airport operational and development costs not covered by user charges and federal and state financial assistance from municipal real estate taxes.

No financial assistance is received by the Port Authority from this source.

New Federal Program

As previously indicated, a new and expanded federal airport aid program (Public Law 91-258) has recently been enacted.

In general, the new legislation provides for a five year federal airport aid program to be primarily funded through federal aviation user taxes with the following annual appropriations:

<u>Purpose</u>	<u>Amount</u>
Air Carrier and Reliever Airports*	\$250,000,000
General Aviation Airports	30,000,000
<u>Airport Planning Grants</u>	<u>15,000,000</u>
Total Annual Appropriation	\$295,000,000

* Most, if not all, of the Supplementary Airports identified in Chapter IV of this Report would be classified as Reliever Airports.

Thus it can be seen that this legislation would provide a vast increase in the annual amounts of federal aid authorized for airport development. The magnitude of this increase is understood when contrasted to the 1970 fiscal year appropriation for the Federal Aid Airport Program in a total amount of \$30,000,000. This contrast is shown as follows:

Federal Airport Aid

<u>Fiscal Period</u>	<u>Annual Appropriation</u>
1970	\$ 30,000,000
1971-1975	\$295,000,000

It is not possible to guarantee at this time, with any significant degree of accuracy or assurance, how much federal airport aid would be available for the eastern Massachusetts region for Air Carrier and General Aviation Airport development during the next ten year period and during the 20 year forecast period 1970-1990.

The lack of any guaranteed estimate of this nature compounds the difficulties inherent in establishing, at this time, a sound program to finance an airport system particularly any new major Air Carrier Airport, for the eastern Massachusetts region.

While there is currently no guaranteed amount of federal financial assistance that could be earmarked for a second major Air Carrier Airport to serve eastern Massachusetts, a recent FAA Report, The National Aviation System Plan, 1971-1980,

dated 1970, does provide an estimated disbursement of federal airport aid funds which was based upon the enactment of the new federal airport program.

The distribution of the total \$2.5 billion dollars is estimated as follows for ten year period 1971-1980:

<u>Type of Grant</u>	<u>Amount (000)</u>
Existing Air Carrier Airports	\$ 602,000
New Air Carrier Airports	1,304,000
Existing General Aviation Airports	176,000
<u>New General Aviation Airports</u>	<u>268,000</u>
TOTAL Airport Project Grants	2,350,000
 Airport Planning Grants	 100,000
 <u>State Planning Grants</u>	 <u>50,000</u>
TOTAL PROGRAM	\$2,500,000

It can be seen from the preceding table that the largest portion of the \$2.5 billion federal aid airport program is anticipated by FAA to be devoted to new Air Carrier Airport development. This portion (\$1,304,000,000) amounts to approximately fifty-two percent (52.2%) of the total program estimate.

It is important to relate the FAA estimate of \$1.3 billion anticipated for new Air Carrier Airport development to the 1968 National Airport Plan, also published by FAA.

The 1968 Plan identified the need for new Air Carrier Airports in the following language:

"New Air Carrier Airports to meet aviation demands which will occur by the 1980 time period could be required at as many as 25 locations. The specific locations and scope of development required for many of these airports are not identified at this time pending further study of the forecast data and analysis of the expansibility of existing facilities. Provision of all these needed facilities may be limited by the very high total development costs, currently estimated in the \$5 billion range.

Six locations for new air carrier airports are identified in this year's amended Plan as being required to meet demands at existing airports which are currently at or near the critical level. These locations are: the New York Metropolitan Area, Boston, Chicago, St. Louis, New Orleans, and Puerto Rico. Development recommended in the 5-year plan period includes early land acquisition and some initial construction."

It is significant to note that eastern Massachusetts (Boston) is identified as one of six locations where a new Air Carrier Airport is required to meet demand and where FAA recommends that early land acquisition and some initial construction of such an airport take place prior to June 30, 1973.

The significance of the federal aid estimates contained in the National Aviation System Plan and the reference to Boston in the National Airport Plan is the FAA emphasis of new Air Carrier Airport development, in general, and the need for a new Air Carrier Airport for the Boston region, in particular.

A matter of critical importance is whether federal aid funds would be available during the forecast period to assist in the construction of airport terminal buildings and utilities to serve terminal buildings.

It is current federal government policy that airport terminal building and associated costs are not eligible for federal financial assistance. Such costs were previously eligible for federal aid and there is now some Congressional sentiment to permit federal aid for terminal building construction expenditures incurred by the local airport operator.

The new federal airport legislation does not provide for any federal aid for terminal building and utility purposes. The U. S. Department of Transportation presently opposes inclusion of airport terminal building and utility development as eligible for federal financial assistance.

The possible second airport project cost item estimates contained in Chapter III of this Report show that the Terminal Area and the Utilities and Drainage cost items constitute the major portion of the total development cost of any of the second airport proposals. It is these items which current federal law and federal policy specifically exclude from federal aid funds. In the event that airport federal aid is denied for these major airport cost items during the forecast period, then the practical result would be to inhibit the early development

of new major Air Carrier Airports in general, and the development of a second Air Carrier airport to serve eastern Massachusetts in particular.

The U. S. Department of Transportation has recognized that the absence of federal financial assistance for terminal building development might inhibit such development if such buildings could only be financed through building rentals and concession revenue. In this testimony before the Aviation Subcommittee of the Senate Committee on Commerce on June 17, 1969, Secretary of Transportation John A. Volpe offered the following comments:

"With respect to terminal area development, we recognize that a very substantial requirement exists (on the order of \$3.5 billion over the next ten years) for new and improved terminals, parking lots, and other passenger handling facilities. The possibility of establishing some form of Federal assistance for these types of facilities was carefully considered. On balance, we concluded that it would be inappropriate to expand Federal activity into this area at a time when we ought to be encouraging and developing state and local capabilities. Also, as I indicated earlier, these types of facilities are usually good revenue producers and capable of being financed by revenue bonds.

Where concession revenues are not adequate, we believe it would be entirely appropriate for the airport operator to impose small charges directly on the airline passengers using the airport facility. Such charges should be imposed only where there is agreement with the airlines serving the airport that the improvements to be financed by the charges are necessary to provide services to the passengers. The bill contains an expression of the sense of Congress that, under these conditions, airports are encouraged to use this approach in providing for their terminal area needs."

In the preceding testimony, Secretary Volpe has offered an alternative method of financing airport terminal building development where building and rental concession revenue are not sufficient to fully finance such terminal building construction.

Whether such airline passenger charges could ever be imposed during the forecast period is uncertain in the light of current constitutional, legal and economic obstacles which currently prevent or discourage the imposition of such charges.

Federal aid for the terminal building and Utilities and Drainage cost items will not be eligible for federal financial assistance in the near future. For the purposes of this Report, it is assumed that no federal financial assistance will be available for airport terminal building and associated costs during the forecast period ending in 1990.

Consequently, it is assumed that terminal building and utilities must be financed through rental and concession revenue charges imposed by the Airport operator, together with such special passenger user charges as may be available.

In the event that neither federal aid funds nor special airline passenger charges become available for terminal building and utility construction during the forecast period, then development of a second major Air Carrier Airport to serve the eastern Massachusetts region would become substantially more

difficult to finance.

It is assumed that airport federal aid will be available to finance fifty percent (50.0%) of airport land acquisition and relocation costs, airport site grading costs, and runway paving costs during the 1970-1990 period in conformance with existing federal law and proposed policy as contained in the proposed legislation now pending before both houses of Congress.

New airport access roadways, which perform no other function other than providing ground access to the airport, are logically part of the capital outlay for the airport development. Any available federal aid would presumably be sought and obtained for the construction of such access roadways. For the purpose of this analysis, however, it is assumed that the entire cost of the access roadway system would be incurred by the Airport Operator.

New State Program

This Report has recommended that the Commonwealth of Massachusetts should now take steps to reserve an appropriate site within eastern Massachusetts for possible use as a second major Air Carrier Airport. This Report has also identified three alternative sites which merit additional investigation prior to selection of one of the three sites as the area to be reserved as the possible second airport site.

It is the opinion of the Committee that the land containing the designated second airport site should be state-owned land.

Once the final decision has been executed by the Governor and the General Court as to the specific location of the possible second airport, it is recommended that the state take immediate steps to acquire the so-called "In Fee" airport area and to acquire the necessary easements for the "Non In Fee" airport area.

It is anticipated that such a land acquisition and easement program would involve total relocation responsibilities on the part of the state government for the homes, businesses and institutions located within the designated airport site area.

For the purposes of land taking, easement acquisition, and relocation activities, it would be necessary to designate an appropriate state agency to assume the administrative and legal responsibility for these actions.

It would be anticipated that appropriate state funds would be made available to enable the designated state agency to accomplish the land acquisition and relocation effort required to reserve the designated airport site. It would also be anticipated that the designated state agency would seek and obtain all the federal airport aid available to assist in the financing of airport acquisition and relocation activities.

Under the federal airport aid program, airport land acquisition and easement costs would be eligible for fifty percent (50%) federal financial assistance. It is assumed that federal aid would be available for fifty percent of relocation expenses.

In view of the fact that it is recommended that the designated airport site would become state owned land, it is recommended that the state government finance the airport acquisition and relocation costs, exclusive of federal aid funds, from state general fund revenue, presumably as a part of the Capital Outlay Program of the Commonwealth.

New Authority Program

Once the designated second airport site had been acquired by the designated state agency, it is recommended that the entire site be made available to the Massachusetts Port Authority through the enactment of legislation similar to the Authority enabling act which transferred the responsibility for the management, operation, and development of the Logan Airport land to the Authority.

The Authority would then be authorized to undertake the initial development of a large General Aviation type of airport (supplementary airport) which would be capable of ultimate expansion to the level of a second major Air Carrier Airport to serve the eastern Massachusetts area. The cost of such airport development would be financed through Port Authority revenue sources and all available federal aid funds during the 1970-1990 period.

Under this program the state investment in a second Air Carrier Airport reserve site would be limited to the investment required to acquire land and relocate existing residents, business firms, and institutions, less available federal aid.

The Authority investment would be limited to the initial development of a General Aviation type of airport at this site until air travel demand for a second major airport would support the staged development of this airport to the status of a major Air Carrier Airport.

The initial development of the site as a general Aviation Type airport would require a substantial initial investment by the Port Authority, if such airport is to possess the basic design and flexibility for future development as a major Air Carrier Airport. The amount and timing of the Authority investment would be dependent upon the character of the site selected and would be dependent upon the ability of the Authority to finance the initial site development.

Assignment of Costs

Based upon the preceding financial program analysis, the following summary table shows an assignment of cost responsibility for the full development of a second major Air Carrier Airport to serve the eastern Massachusetts region during the next twenty year period:

<u>Cost Item</u>	<u>Federal Cost</u>	<u>State Cost</u>	<u>MPA Cost</u>
Land Acquisition*	50%	50%	-
Site Grading	50%	-	50%
Runway Paving	50%	-	50%
Terminal Area	-	-	100%
Utilities and Drainage	-	-	100%
Access Highways	-	-	100%

As indicated earlier in the text of this Chapter, there is the possibility that federal aid may become available for the Terminal Area, Utilities and Drainage, and Access Highways cost items in the future.

Alternative Airport Cost Assignment

The assignment of cost responsibility (exclusive of relocation costs) to each of the six alternative fully developed airport sites intensively analyzed by the Committee is shown in the following summary tables:

DOVER

<u>Cost Item</u>	<u>Federal (000)</u>	<u>State (000)</u>	<u>MPA (000)</u>
Land Acquisition	\$44,050	\$44,050	-
Site Grading	26,600	-	\$ 26,600
Runway Paving	10,000	-	10,000
Terminal Area	-	-	160,000
Utilities, etc.	-	-	100,000
Access Highways	-	-	4,500
Total Cost	\$80,650	\$44,050	\$301,100

HOPKINTON-EAST

<u>Cost Item</u>	<u>Federal (000)</u>	<u>State (000)</u>	<u>MPA (000)</u>
Land Acquisition	\$35,000	\$35,000	-
Site Grading	22,300	-	\$ 22,300
Runway Paving	10,000	-	10,000
Terminal Area	-	-	160,000
Utilities, etc.	-	-	100,000
Access Highways	-	-	5,600
Total Cost	\$67,000	\$35,000	\$297,300

* Includes relocation costs

OTIS AIR FORCE BASE

<u>Cost Item</u>	<u>Federal (000)</u>	<u>State (000)</u>	<u>MPA (000)</u>
Land Acquisition	Unknown	Unknown	-
Site Grading	\$ 7,750	-	\$ 7,750
Runway Paving	10,000	-	10,000
Terminal Area	-	-	160,000
Utilities, etc.	-	-	90,000
Access Highways	-	-	1,500
Total Cost	\$17,750*	Unknown	\$269,250

PLYMOUTH-CARVER

<u>Cost Item</u>	<u>Federal (000)</u>	<u>State (000)</u>	<u>MPA (000)</u>
Land Acquisition	\$ 7,100	\$ 7,100	-
Site Grading	4,750	-	\$ 4,750
Runway Paving	10,000	-	10,000
Terminal Area	-	-	160,000
Utilities, etc.	-	-	100,000
Access Highways	-	-	3,750
Total Cost	\$21,850	\$ 7,100	\$278,500

SHARON-EASTON

<u>Cost Item</u>	<u>Federal (000)</u>	<u>State (000)</u>	<u>MPA (000)</u>
Land Acquisition	\$21,000	\$21,000	-
Site Grading	11,000	-	\$ 11,000
Runway Paving	10,000	-	10,000
Terminal Area	-	-	160,000
Utilities, etc.	-	-	100,000
Access Highways	-	-	11,400
Total Cost	\$42,000	\$21,000	\$292,400

DOUGLAS-UXBRIDGE

<u>Cost Item</u>	<u>Federal (000)</u>	<u>State (000)</u>	<u>MPA (000)</u>
Land Acquisition	\$ 6,950	\$ 6,950	-
Site Grading	21,750	-	\$ 21,750
Runway Paving	10,000	-	10,000
Terminal Area	-	-	160,000
Utilities, etc.	-	-	100,000
Access Highways	-	-	23,000
Total Cost	\$38,700	\$ 6,950	\$314,750

* Land Acquisition Costs not included.

Airport Development Schedule

Under the organizational and financial proposals described herein, it is recommended that there be a contingent staged development program of the possible second Air Carrier Airport site during the 1970-1990 period.

This Contingent Development Program is scheduled as follows:

<u>Period</u>	<u>Activity</u>
1970-1971	Detailed Site Selection Investigation
1971-1973	Land Acquisition and Relocation
1973-1975	Supplementary Airport Development (IF FINANCING IS AVAILABLE)
1975-1990	Air Carrier Airport Development (IF NEED IS CONCLUSIVELY DEMONSTRATED)

In the event that it becomes clearly evident by 1972 that a second major Air Carrier Airport will be necessary to serve the eastern Massachusetts region, then development of such a major Airport should commence in 1972 with a target date of initiation of some Air Carrier operations by the late 1970's.

Supplemental Airport Program Schedule

It is anticipated that the MAC State Airport Construction Program recommended for the eastern Massachusetts region in Chapter V would occur according to the following schedule, which would be geared to the expected availability of federal financial assistance during the 1970-1990 period:

<u>Time Period</u>	<u>Federal Aid (000)</u>	<u>State Aid (000)</u>	<u>Total Amount</u>
1971-1975	\$6,000	\$6,000	\$12,000
1976-1980	6,000	6,000	12,000
1981-1985	6,000	6,000	12,000
<u>1986-1990</u>	<u>6,000</u>	<u>6,000</u>	<u>12,000</u>
TOTALS	\$24,000	\$24,000	\$48,000

SEPARATE STATEMENT OF MAPC COMMITTEE MEMBER

This Report indicates that the Logan Airport Expansion Program described herein, together with appropriate Airport Terminal Area development, and the development of a supplemental airport system as described in Chapter IV of this Report, would serve as a probable alternative means to meet the anticipated growth of Air Carrier Operations within the eastern Massachusetts region during the forecast period.

The Logan Airport Expansion Program recommended by the majority of the Committee anticipates that Logan Airport will continue to serve most types of aircraft to be operated by the Certificated Air Carriers during the forecast period 1970-1990.

There is now a critical land use incompatibility between the frequent operation of heavy jet aircraft at Logan Airport and the densely populated areas surrounding Logan Airport.

A recent important report, jointly commissioned and financed by the U. S. Department of Transportation and the U. S. Department of Housing and Urban Development, prepared by the Consultant Firm of Bolt, Beranek and Newman of Cambridge, Massachusetts, entitled: Aircraft Noise and Airport Neighbors: A Study of Logan Airport, has indicated the character and extent of the existing and probable future adverse impact of noise generated by aircraft upon neighboring residential areas.

This report discloses that approximately 30,000 persons currently reside in the areas considered to be least compatible with aircraft noise. With the increased frequency of operations and introduction of the Supersonic Transport, this area would be expanded to encompass over 75,000 residents.

On the other hand, the report indicates that a combination of measures including flight track changes, jet engine power cutbacks, elimination of four engine turbine (heavy jet) aircraft, and a night curfew would be expected to reduce the noise exposure to one third of the current value.

This report serves as evidence that these measures should be undertaken as a long-range policy goal for Boston Logan Airport.

The ultimate relocation of heavy jet aircraft operations from Boston Logan Airport to an alternative second major Air Carrier Airport would render highly questionable many of the elements of the expansion program recommended in this Report.

The proposed runway projects should be closely re-examined within the context of a recommended policy goal to relocate all heavy jet aircraft operations by the late 1970's to a more appropriate second major Air Carrier Airport serving the eastern Massachusetts region and the concurrent transformation of Logan Airport into a short and medium haul Air Carrier Airport limited to medium size jet aircraft operations.

The existing restriction relative to aircraft operations on runway 4L-22R should be retained in order to protect the Bayswater Street neighborhood from an intensification of aircraft noise.

There are few locations in southeastern New England that reasonably can be sites for a large 15,000, or more, acre modern jetport. There are no acceptable and available land areas within the Boston metropolitan area for such an installation.

Logan International Airport, Sharon, Dover, Bedford and Hopkinton are not feasible simply because excessive numbers of people and facilities would be dislocated by land takings or would otherwise be adversely affected by noise and other pollutants.

A recommended second Air Carrier airport location that is closer to metropolitan Boston and most other New England cities than either Plymouth or Otis is the Uxbridge-Douglas area, southwest of Boston near the Rhode Island state line. During the years ahead the Uxbridge-Douglas area will prove to be more accessible to more people than any other available site within Massachusetts. It is situated in the direction of a growing and spreading New England population, and benefits from reasonable proximity to an expanding regional highway system including the Massachusetts Turnpike, Interstate 495, Route 146, the planned north-south expressway through Worcester County, and a new expressway proposed in the long-range highway program of the Commonwealth directly toward the Uxbridge area from Route 128 (Route 209).

The Uxbridge-Douglas area is sparsely settled and would cause a minimum of housing, commercial and institutional relocation. Land is available for more than adequate buffer zones, and the opportunity exists to stimulate the regional economy with carefully planned air associated commercial, industrial and institutional parks.

For these reasons, and others contained in the MAPC Staff Report of July 1969 "Boston Metropolitan Airport System, 1970-1990" the Uxbridge-Douglas area deserves prime consideration by those who will have the final responsibility for locating a new southeastern New England International Air Carrier Airport.

The Supplemental Airport System should be planned, designed, constructed and operated for general aviation activities, and for limited commuter type airline operations utilizing small aircraft (less than 12,500 lbs.) which are compatible with the airport environment.

Large and medium size airline jet aircraft (in excess of 12,500 lbs.) are not appropriate for operation at those supplemental airports located within the Boston metropolitan area.

The expansion of existing supplemental airports and the creation of new supplemental airports must be undertaken so that proper noise standards are strictly applied and enforced.

The proposed Hopkinton area supplementary airport is inappropriate for that location and consequently this proposed airport should be located in the Uxbridge-Douglas area.

SEPARATE STATEMENT BY MPA COMMITTEE MEMBER

While the Massachusetts Port Authority concurs with the basic conclusions and recommendations of the appended report we are not in complete agreement with all details and believe that insufficient emphasis has been given to certain critical factors prerequisite to attainment of the Study objective.

In the selection of any site for a second air carrier airport, the vital importance of its location with respect to market accessibility is a factor which cannot be emphasized strongly enough. Although all other factors affecting site acceptability must also be met to a reasonable degree, it is imperative that the site be sufficiently accessible to the market to insure that adequate market potential will be realized. It is of paramount concern that the major concentration of population in need of air transportation services will actually use the airport, if constructed. Otherwise, there can be no need for an airport in that location, regardless of how desirable it may be in every other respect. If not used to a significant degree, there can be no basis for financing the development through user charges. This could only result in what we consider to be the unacceptable alternative of placing the burden for development on the Massachusetts taxpayer. Irrespective of this, it is also plainly evident that any site which does not attract sufficient volumes of traffic to significantly decrease the air carrier demand upon Logan would completely defeat the basic purpose of establishing a second air carrier airport in the first place. Logan would continue to be saturated, unable to meet the air service requirements of the Metropolitan Boston area, and a tremendous investment would have been made without any substantial relief from the very problem for which it was expended.

A careful balance must be struck between the various basic site selection criteria which tend to counter-oppose one another, since land availability and compatibility of use have a tendency to be more easily obtainable in areas remote from market demand. On the other hand, it logically follows that locations close to the market have limited land availability and possibilities for compatible land use become more difficult to achieve. We must conclude, therefore, that unless this fine balance can be achieved, there will be no real solution. We would caution that any final site selection which is, or may be, decided upon merely be-

cause it is highly acceptable due to land availability and remoteness from populated areas, must be deemed unacceptable should it fail to meet adequately its primary objective -- that of serving the air transport market demand.

Related to market demand, is the suggestion frequently made that the need for capacity at Logan, as well as runway length requirements, could be substantially diminished if international service were transferred to a remote airport site; for example, one of several military air bases each sixty miles or more from Boston. We would acknowledge the fact that the excessive distance to such remote locations becomes less critical as the length of the air trip increases. It is conceivable that a one and a half hour drive to the airport for the European passenger would not discourage a significant number of potential passengers from making the trip. The fallacy in this reasoning lies in several areas. First, a major portion of international traffic is, in fact, short haul. Service to principal cities in Canada and Bermuda, which constitutes nearly 70% of the total international traffic, ranges only between one and two hours in flight time and is operated with aircraft that are small enough to serve the short and medium haul domestic routes. Secondly, the runway length necessary for international flights is little different than for the longer haul domestic flights. To eliminate them from Logan would have no significant impact on runway length requirements. Thirdly, international long haul flights constitute a relatively minor portion of total aircraft operations and operate principally at off-peak periods in relation to domestic air service. To relocate these long-haul flights to another airport remote from the market would prove of **little value** in making significant additional capacity available at Logan for the shorter haul domestic flights. Fourth, and very significant, is the fact that international service through the Boston Gateway must be supplemented by connecting traffic to and from other cities within the United States. Without this supplemental traffic from other areas, the airlines would be unable to support the broader pattern of European service now available. This will become increasingly true with the advent of greater capacity aircraft such as the Boeing 747. The Boston market itself can support service only to the strongest route segments such as Boston-London. It therefore becomes **extremely important** that convenient and frequent connecting service be provided between the international gateway and principal United States cities. However, with international air service from Boston

operating exclusively from a separate and remote airport, the limited international market could not conceivably support adequate domestic connecting service for this purpose alone. Lacking this frequent and convenient domestic connecting service, the majority of the potential market through the Boston Gateway would be lost to other competing Gateways, and transatlantic service from Boston would degenerate to a level and pattern of service which could be supported by the Metropolitan Boston market only.

We feel, therefore, that it is unrealistic to assume that the capacity problem that may occur at Logan in the future can be realistically or significantly helped through a transfer of international air service from Logan to a remote international gateway airport and that to do so would only serve to degrade international air service through the Boston Gateway.

In summary, we wish to emphasize again that the site for a second air carrier airport, when and if construction becomes necessary, must be located sufficiently close to the major air passenger market which it will serve to insure that adequate traffic will be generated to support its development as well as to provide the necessary capacity relief for Logan which prompted that development.

SEPARATE STATEMENT BY DPW COMMITTEE MEMBER

The Department of Public Works recognized the need for modifications and operational improvements at Logan International Airport. These modifications and improvements must be geared to providing maximum safety to both passengers and aircraft, provide greater efficiency in existing levels of operations by means of technological aids to navigation and landing operations. The Department endorses the policy of developing all weather operations as feasible means become available. Unrestricted capacity growth cannot be endorsed unless it can be guaranteed that tolerable environmental noise and smoke levels, consistent with established standards, will be maintained. The Department of Public Works endorses improvement of Boston Logan's physical and navigational plant for safety and for operational efficiency but not to extent of increasingly degrading the environmental conditions of its immediate neighbors. It is our conclusion that the air carrier and aircraft design sectors of the air transport industry must address themselves to the problems of existing and proposed airports plagued with restrictive environments.

The Department of Public Works advocates that the expansion program outlined in this report should only be presented as one of the alternative solutions to providing facilities for the forecasted air operations in the study area. Any decision on the future physical expansion of Boston Logan must be a political consideration which will reflect economic, social and environmental factors.

The Department of Public Works as the grantor of licenses to fill or in any way extend the natural shore line cannot, as a matter of course, be placed in a position of rendering a decision before the fact. Essentially the granting of a license is a judicial procedure requiring a public hearing and a judgment on the merits of the application with due regard to the rights and interests of all concerned parties. The Department is in no position to waive or compromise this prior process in its participation in this study.

SEPARATE STATEMENT BY MAC COMMITTEE MEMBER

This study concludes that Boston's demands for air transportation through 1990 can be accommodated, so far as airports are concerned, by substantial improvement of the Boston-Logan airport as the main airline terminal, together with completion of the current State and National Plans for other airports in the metropolitan area. We agree.

It goes on to conclude that if for any reason the required improvements to the Boston-Logan airport cannot be accomplished, then it will be necessary to create a second major jetport to serve Boston, recommends reservation of a site for the purpose, and describes and cost evaluates three potential locations--Hopkinton, Plymouth and Otis Air Force Base. We agree in part, but not, for the following reasons, with the "either or" syndrome.

- a. The capacity of the second airport as designed and priced would be greater than the total forecast Boston demand for airline operations, a capacity only reasonably justified if the Boston-Logan airport was to be abandoned, and we don't believe this will or should happen.
- b. We don't believe that either economic or environmental factors will permit the establishment of a new major jetport substantially more convenient to the Boston air travel market than several existing military airports. Some of these will almost certainly be deactivated, or will become available for joint civil/military use before a new major airport could be built, and they can be adapted for civil use at much less cost and public disruption.
- c. While we agree that the recommended Boston metropolitan airport system will accommodate the future demand in numbers of aircraft movements, we are not convinced that it will or should accommodate all anticipated types of future aircraft operations. For instance, we are concerned about what is called the sideline noise of the SST. The French/British version, the Concorde, is scheduled to be ready for North Atlantic service by the middle of 1973, and the Russian TU144 should be ready soon thereafter. Even though there is some doubt about the future of the U.S. Boeing 2707, there is no doubt

that the British, French and Russian governments will exert great diplomatic pressure to ensure that their SST's, already in being, are operated between Europe and the United States, so that they can cash in on their investment. While the traveling public will desire access to such supersonic service, we are not sure that the affected residential public will readily accept its noise at existing civil airports in the northeast.

- d. Otis Air Force Base could handle, in addition to its present military activity if necessary, any foreseeable Boston and New York transatlantic SST schedules, with no substantial or costly improvements to the landing area. Adequate passenger handling facilities would be needed.
- e. The 20,000 acres of land owned by the Commonwealth surrounding the Otis runways provide a noise buffer zone not even remotely approached at Boston-Logan or New York's Kennedy. This area has for many years experienced the operation of tactical military airplanes having noise characteristics similar to the civil SST without substantial public objection.
- f. Some of our colleagues have questioned the marketability of Otis because it is sixty miles from downtown Boston. We agree that this tends to make it unattractive to Boston passengers for short and medium range flights. However, if it should become impractical to terminate some types of transatlantic flights at Boston's Logan, or New York's Kennedy, we don't consider the relative remoteness of Otis to be a drawback--rather the opposite.

It includes a number of recommendations affecting the administration, financing, and development of airports included in the State and National Airport Plans other than the two under the control of the Massachusetts Port Authority.

These are well reasoned and carefully documented recommendations, which we support with only one reservation. The Bureau of Transportation Planning and Development of the Department of Public Works and the Massachusetts Aeronautics Commission have proposed a jointly prepared statewide airport system plan to be fully integrated with local, regional and

statewide transportation plans. 2/3rds of the cost of its preparation would be eligible for a federal grant. Excepting the ones for which the MPA is responsible, we believe that construction of new airports, or major expansion of existing airports, should wait upon completion of such a plan.

In view of the above, we favor this course of action --

1. Undertake those physical improvements to the Boston-Logan airport which provide maximum safety for passengers, abutments and airplanes. This includes the facilities required for all weather operations, and the construction of the proposed parallel runways for improved flexibility and efficiency of operations, with particular respect to noise and other pollution abatement procedures.
2. Select Otis as the reserved site to back up Boston-Logan.
3. Start negotiations for the acquisition of the necessary rights at Otis, to enable it to be used, if necessary, as a nexus, via appropriate connecting transportation, for critical types of intercontinental flights serving Boston, New York and other continental traffic generating points, and as a primary air terminal to serve Cape Cod and adjacent areas.
4. Provide the necessary local funding at once for the proposed DPW/MAC statewide airport system study.

SEPARATE STATEMENT BY FAA COMMITTEE MEMBER

Although there is a possibility that Boston-Logan International Airport can be developed to meet forecast requirements, this can only come to pass if various untested theories prove to be correct and the airport is permitted to develop without constraint. Neither can be forecast with any degree of assurance at this time, therefore sensible planning dictates the land banking of a site for a second major airport.

The Boston-Logan revised master plan, as recommended in this Report, has not been approved by this agency. While we see merit in the committee recommendations to improve the noise factors and capacity of the presently approved plan by the extension to Runways 22L, 22R, construct new STOL Runway 4-22 and the deletion of proposed Runway 9-27, our approval would be subject to revision of the presently approved plan and further detailed analysis. It should be noted that the revised master plan does not show much of the development recommended for Logan in the "Alexander Report."

Otis Air Force Base - we consider that a more detailed analysis should be made of the Hopkinton and Plymouth areas. If these sites cannot be developed, then we suggest that further study for any second site which would include Otis Air Force Base might also include possible sites in Eastern Connecticut and Manchester, New Hampshire, in order to assure consideration of all possible locations capable of similar service.

The FAA has provided technical assistance in the development of Chapter I through IV, however, FAA has not contributed in the development of recommendations for organizational and financial programs in Chapter V and Chapter VI.

APPENDIX A

INTER-AGENCY METROPOLITAN AIRPORT STUDY TECHNICAL COMMITTEE

The following Construction Cost Data have been compiled by the Design Section of the Highway Engineering Division of the Department of Public Works.

The data are based on sixteen (16) interstate projects constructed or advertised between 1966 and 1968. The compilation covers construction unit costs only and does not reflect costs associated with projects calling for extensive viaduct, bridge or tunnel design.

¹CONSTRUCTION COSTS

<u>Type</u>	<u>Number of Lanes</u>	<u>Average Per Mile Cost</u>
Urban	6	\$5,100,000
Urban	8	5,400,000
Rural	6	1,700,000

Same projects with right of way data

²RIGHT OF WAY COSTS

<u>Type</u>	<u>Number of Lanes</u>	<u>Average Per Mile Cost</u>
Urban	6	\$1,232,300
Urban	8	2,434,700
Rural	6	193,000

COMBINED COSTS

<u>Type</u>	<u>Number of Lanes</u>	<u>Average Per Mile Cost</u>
Urban	6	\$6,332,200

cont.

<u>Type</u>	<u>Number of Lanes</u>	<u>Average Per Mile Cost</u>
Urban	8	\$7,834,700
Rural	6	\$1,893,000

1 Figures from Highway Design Section

2 Figures from Federal Aid Section

APPENDIX B

SPECIAL CONSULTANT REPORT

This appendix contains a special report prepared by the firm of Landrum and Brown of Cincinnati, Ohio, relative to the market potential of the various airport sites intensively analyzed by the Committee.

ANALYSIS OF EXPANDED MARKET POTENTIAL REALIZATION

Some of the Airport sites under study were located a considerable distance from the study area as defined in the Consultant's Report. MPA directed the consultant to determine the enplaned passenger volumes for all the airport sites being considered by the Committee using the previously defined study area plus additional communities outside the area that could be served by a new jet port facility.

STUDY AREA ENPLANED PASSENGER VOLUMES

As a first step, the enplaned passenger volumes which could be realized from the Study Area used in 1968 studies at each of the three alternative sites, when paired with Boston-Logan International Airport, were determined using the same procedures and the same Study Area as used in the 1968 studies. Since this determination for the Hopkinton Site was made in the 1968 studies, it was not necessary to complete this step for Hopkinton.

Enplaned passenger volumes which could be realized at each of the alternate sites from the Study Area are estimated to be as follows:

<u>Alternate Site</u>	<u>Enplaned Passengers</u>	
	<u>1980</u>	<u>1990</u>
Hopkinton Site	766,000	1,353,000
Plymouth Site	139,000	259,000
Otis Air Force Base	7,000	14,000

The foregoing passenger volumes do not give consideration to the passenger potential from areas and communities outside the Study Area.

This exhibits contains a special report, prepared by the firm of Lincoln's and Brown of Cambridge, Mass., which is for the purpose of showing the various physical and chemical changes which have taken place in the material.

REPORT OF THE COMMITTEE ON THE PROGRESS OF THE WORK

Some of the results of the work done during the year 1900 are given in the following table. The work was done in the laboratory of the Committee on the Progress of the Work, and the results are given in the following table. The work was done in the laboratory of the Committee on the Progress of the Work, and the results are given in the following table.

TABLE A. ANALYSIS OF THE SAMPLES

In a series of experiments, the following results were obtained. The results are given in the following table. The work was done in the laboratory of the Committee on the Progress of the Work, and the results are given in the following table.

The following table gives the results of the experiments. The work was done in the laboratory of the Committee on the Progress of the Work, and the results are given in the following table.

ANALYSIS OF THE SAMPLES	
Sample No. 1	Sample No. 2
Sample No. 3	Sample No. 4
Sample No. 5	Sample No. 6
Sample No. 7	Sample No. 8
Sample No. 9	Sample No. 10
Sample No. 11	Sample No. 12
Sample No. 13	Sample No. 14
Sample No. 15	Sample No. 16
Sample No. 17	Sample No. 18
Sample No. 19	Sample No. 20

The following table gives the results of the experiments. The work was done in the laboratory of the Committee on the Progress of the Work, and the results are given in the following table.

ENPLANED PASSENGERS FROM OUTSIDE THE STUDY AREA

As the next step, a determination was made of the enplaned passenger volumes which might be realized at each of the alternate sites from the major communities immediately surrounding the Study Area and adjacent to the alternate sites.

The communities which were considered in determining the impact of air passenger volumes drawn from the communities surrounding the Study Area included:

Manchester, New Hampshire	Hyannis, Massachusetts
Worcester, Massachusetts	Lowell, Massachusetts
Providence, Rhode Island	Lawrence, Massachusetts
New Bedford/Fall River, Massachusetts	

All of the foregoing communities, except Lowell and Lawrence, currently have airports receiving scheduled airline service.

Criteria For Estimating Enplaned Passenger Potential Realized

In determining estimated enplaned passenger volumes which might be realized from the surrounding communities consideration was given to:

1. The effect of accessibility (time and distance) upon the realization of the passenger volumes from those communities. The more remote the community from the alternate airport site, the smaller the passenger volumes which that alternate site could expect to realize from the community.
2. The quality of air service currently available at each of the communities' airports as compared to that which could reasonably be anticipated at the alternate sites, based upon the estimated passenger volumes which could be realized from the Study Area at the alternate sites. If the quality of air service at the alternate sites is superior to that offered at the communities' existing airports, passenger volumes will be attracted from the existing airports to the alternate sites, if the drawing power of the improved quality of air service is not offset by the effect of accessibility.

3. The existing airports serving each of the surrounding communities will continue to operate. To the extent that any of these existing airports do not continue to operate, part of the enplaned passenger volumes which would have been realized at these existing airports in the future may be realized at the alternate sites being considered.
4. The competitive impact of Boston-Logan International Airport in terms of Logan being closer than the alternate sites to some of the surrounding communities. For example: Logan is closer to Lowell and to Lawrence than are any of the three alternate sites. Consequently, passenger volumes at those communities could reasonably be anticipated to be realized at Logan rather than any of the alternate sites.
5. Passenger volumes from the surrounding communities whose air trip destination is Boston itself. It should be noted that some of the passengers enplaned at the airports serving the surrounding communities take air trips to Boston. However, if service were not available at those airports, the passengers from these communities would probably drive directly to Boston rather than drive to one of the alternate sites, which are more remote than the existing airports and then board a plane for a trip to Boston.

With respect to the first two of the foregoing criteria, it should be noted that there are broad measures of the effect of both accessibility and the quality of air service on the realization of the potential passenger volumes. These measures were used in the development of the Master Air Service Plan, where the effect of both the quality of the air service offered and the accessibility were considered together in establishing air service class definitions. It was found that for each additional ten miles of ground travel between a passenger's point of origin or destination an improvement in the quality of air service offered, as defined in the Master Air Service Plan, would be required in order to induce that passenger to use the airport.

In completing this step we looked at the potential passenger volumes which might be realized at each of the alternate

sites from the surrounding communities on an individual basis.

Hopkinton Site

Starting first with the Hopkinton site, it was found that the major concentrations of population are located closer to Logan than to Hopkinton, except Providence and Worcester. For those communities closer to Logan, any passengers attracted from those communities' airports would probably be realized at Logan since they are closer to Logan, and Logan would also have a superior quality of air service compared to that which might be anticipated for the Hopkinton site. With respect to both Worcester and Providence, their principal air travel market is New York. The improvement in the quality of service to New York which could be anticipated at Hopkinton as compared to that available at the Worcester Airport would not be great enough to offset the effect of the greater time and distance which would be involved for Worcester passengers going to the Hopkinton site rather than to their own airport. Worcester now has five non-stop round trips daily to New York at convenient times of the day for arrival and departure. With this quality of service available it would be difficult to attract Worcester passengers to the more remote Hopkinton site. To do so would require the highest quality of air service at the Hopkinton site. The Hopkinton Site could expect to realize few, if any, of the Worcester passengers.

With respect to Providence, the quality of air service would be about equal to that which could be anticipated at the Hopkinton site. This is predicated on the quality of air service having a reasonably direct relation to passenger volumes. Airports having about the same passenger volumes can be expected to have similar quality of air service. The passenger volumes realized by Hopkinton from the Study Area are anticipated to be about the same as the estimated Providence Airport passenger volumes. The Hopkinton Site would, on the average, be more remote for Providence's passengers than their own airport. By way of example, the Hopkinton Site is about twenty-six miles from the center of Providence, while the Providence Airport is only seven miles. With no anticipated improvement in the quality of air service at Hopkinton over that offered at Providence to offset the effect of greater ground travel time requirements to the Hopkinton Site, the Hopkinton Site could be expected to attract few, if any, passengers from the Providence Airport.

It should be noted, however, that if the Worcester and

Providence Airports were to be closed, the Hopkinton Site could expect to realize in 1990 about 60% of the passenger volumes which would have been realized at the Providence Airport and about 75% of the volumes which would have been realized at the Worcester Airport, based on applying measures of the effect of accessibility.

Plymouth Site

Considering the Plymouth Site next it was found that all of the surrounding communities except Providence, New Bedford, Fall River and Hyannis are located closer to Logan than to the Plymouth Site. For those communities located closer to Logan any passengers attracted from those communities' airports would be realized at Logan. This would result because they are not only closer to Logan but Logan also has a superior quality of air service compared to that which could reasonably be anticipated for the Plymouth Site. The principal air travel market of both Providence and New Bedford is New York. The quality of air service which could be anticipated at the Plymouth Site would not be as good as that which could be expected at the Providence Airport. The improvement in the quality of service to New York which could be anticipated to be provided at Plymouth, as compared to that available at the New Bedford Airport would not be great enough to offset the effect of the greater time and distance which would be involved for the New Bedford passengers going to the Plymouth Site rather than to their own airport. Consequently, the Plymouth Site could expect to realize few, if any, of the passenger volumes which are now being realized by the Providence and New Bedford Airports.

With respect to Hyannis, even though the Hyannis Airport is located even more conveniently to its passengers than would be the Plymouth Site, the quality of air service which could be anticipated at the Plymouth Site would be significantly better than that which would probably be available at the Hyannis Airport. Consequently, the Plymouth Site could be anticipated to realize some of the passengers, who might otherwise use the Hyannis Airport. It was found that approximately fifty percent (50%) of the Hyannis passengers could be attracted to the Plymouth Site. This would amount to about 15,000 passengers in 1980 and about 22,000 passengers in 1990. These are, of course, very minor passenger volumes relative to the total Boston Metropolitan Area air passenger volumes. As in the case of the Hopkinton Site, determination was made of the percentage of the New Bedford, Providence and Hyannis passengers which might be realized at the Plymouth Site if those

airports were to be closed. Giving consideration to the effect of the greater time and distance involved in going to the Plymouth Site, which is more remotely located than are their own airports, it was found that the Plymouth Site could realize approximately fifty percent (50%) of the Providence passengers, and sixty-five percent (65%) of the New Bedford and Hyannis passengers if those communities' airports were to be closed.

Otis Air Force Base Site

Considering the Otis Air Force Base Site next, it was found that all of the surrounding communities except New Bedford/Fall River and Hyannis are located closer to Logan than they are to Otis Air Force Base. As indicated previously for the Hopkinton and Plymouth Sites, those passengers which could be attracted from those communities located closer to Logan would be realized at Logan rather than the Otis Air Force Base Site. The reason for this is the more accessible location of Logan and the superior quality of air service available at Logan as compared to that which could be anticipated at the Otis Air Force Base Site.

Both New Bedford/Fall River and Hyannis are located more remote from the Otis Air Force Base than they are from their own airports. In addition, the quality of air service which could be anticipated at the Otis Air Force Base Site, based upon the enplaned passenger volumes it would realize from the Study Area, is not as good as that which could be expected at those communities' own airports. Consequently, the Otis Air Force Base Site could not be expected to attract any significant volume of passengers from these communities if their airports were to continue in operation. However, if the airports at New Bedford and Hyannis were closed, it is estimated that the Otis Air Force Base, based upon the application of the measures of the effect of accessibility, would realize approximately sixty percent (60%) of the passenger volumes which would have been realized at the New Bedford Airport and about thirty percent (30%) of the passenger volumes which would have been realized at the Hyannis Airport.

It is recognized that there might be people from communities who would be realized at any one of the alternate sites, rather than at their own airport or at Logan, even though the alternate site is more remote. However, such passenger volumes would be a minor amount.

Sharon/Easton Site

Since this site has been extensively covered in the 1968 Preliminary Study, it was considered unnecessary to repeat those findings in this study. Briefly, it was determined that Sharon/Easton, as an alternate site to the Preliminary Study's first choice of Dover, would next best serve the Boston air travel market. It can be seen on the following tables that, of these five contending sites in this study, Sharon/Easton would be the best of the five in terms of realizing the most passengers in combination with Logan.

Uxbridge Site

As is the case for other remote sites, Uxbridge could not expect to attract any significant volumes of passengers from the Study Area. As indicated previously for the Plymouth site, those passengers which could be attracted from those communities located closer to Logan would be realized at Logan rather than Uxbridge. The major reason for this is the more accessible location of Logan and the superior quality of air service available at Logan as compared to that which could be anticipated at Uxbridge.

It should be noted, however, that as in the case of the Hopkinton site, for reference purposes only, the same additional passenger volumes used there should Worcester and Providence Airports be closed would be applicable to the Uxbridge site.

Summary

Giving consideration to the enplaned air passenger volumes both realized from within the Study Area and from the surrounding communities, the enplaned passenger volumes which might be realized at each of the alternate sites, when paired with Logan, are as follows:

<u>Alternate Site</u>	<u>Enplaned Passengers</u>	
	<u>1980</u>	<u>1990</u>
Dover Site	2,486,000	3,806,000
Hopkinton Site	766,000	1,353,000
Plymouth Site	154,000	281,000
Sharon/Easton	1,547,000	2,563,000
Otis Air Force Base	7,000	14,000
Uxbridge	377,000	730,000

The estimated enplaned passenger volumes are not sufficient to support a major air service center development at either the Plymouth site, the Otis Air Force Base site, or the Uxbridge site. The Hopkinton site, as indicated in the 1968 studies, would develop significant enplaned passenger volumes but these volumes would represent only about 10% of the total passenger volumes which could be realized by Hopkinton and Logan together. The other 90% of the enplaned passenger volumes would have to be handled by Logan. In addition, the foregoing estimates of enplaned passenger volumes for each of the alternate sites demonstrates that the sites at Plymouth, Otis Air Force Base and Uxbridge, would not serve the Study Area (which includes the City of Boston and the immediately adjacent substantial sized communities) to any appreciable extent.

To provide a measure of the relative passenger volumes which would continue to be served by Logan, as compared with the alternate sites' volumes, the following table shows the estimated 1980 and 1990 enplaned passenger volumes which would be realized by each airport and airport combination, when Logan is paired with each of the alternate sites. These estimates are predicated upon the existing airports serving the surrounding communities continuing in operation during the forecast period.

<u>AIRPORT COMBINATIONS</u>	<u>ENPLANED PASSENGERS</u>	
	<u>1980</u>	<u>1990</u>
Hopkinton-Logan		
Logan	7,318,000	10,567,000
Hopkinton	<u>766,000</u>	<u>1,353,000</u>
TOTAL	8,084,000	11,920,000
Plymouth-Logan		
Logan	7,807,000	11,368,000
Plymouth	<u>154,000*</u>	<u>281,000</u>
	7,961,000	11,649,000
Otis Air Force Base-Logan		
Logan	7,902,000	11,552,000
Otis	<u>7,000</u>	<u>14,000</u>
	7,909,000	11,566,000
Sharon-Logan		
Logan	6,700,000	9,600,000
Sharon	<u>1,547,000</u>	<u>2,563,000</u>
	8,247,000	12,163,000
Uxbridge-Logan		
Logan	7,125,000	11,040,000
Uxbridge	<u>377,000</u>	<u>730,000</u>
	7,502,000	11,770,000
Dover-Logan		
Logan	5,930,000	8,568,000
Dover	<u>2,486,000</u>	<u>3,806,000</u>
	8,416,000	12,374,000

*Includes 15,000 passengers attracted from Hyannis Airport in 1980 and 22,000 in 1990.

INTER-AGENCY AGREEMENT
FOR THE PURPOSE OF CONDUCTING
A METROPOLITAN AIRPORT SYSTEM
STUDY AND PLAN

THIS AGREEMENT made this sixth day of October, 1966
by and between THE METROPOLITAN AREA PLANNING COUNCIL ("Council"),
the MASSACHUSETTS PORT AUTHORITY ("Authority") and the DEPARTMENT
OF PUBLIC WORKS, ("DPW"), of the COMMONWEALTH OF MASSACHUSETTS
("Commonwealth") being hereinafter collectively referred to as
the "Agencies."

WHEREAS, each of the Agencies is concerned with, and desires
to participate in a study of and plan for airport facilities in
the Boston Metropolitan Area; and,

WHEREAS, it is the intent of the Agencies that such a study
and plan be reasonably consistent and coordinated with comprehen-
sive land use and transportation plans being undertaken by the
Eastern Massachusetts Regional Planning Project, (EMRPP): and,

WHEREAS, it is agreed that it is the interest of each of the
Agencies and in the public interest that such study and plan be
coordinated and undertaken in an integrated and cooperative
manner; and,

WHEREAS, each of the Agencies is willing to participate to
the extent hereinafter specified in such study and plan,

NOW THEREFORE, it is hereby agreed by and between the parties
hereto as follows:

1. Each of the Agencies shall make a contribution, in the form

of cash or services equal to the amount set opposite its name respectively:

<u>Agency</u>	<u>Amount</u>		
	<u>Money</u>	<u>Services</u>	<u>Total</u>
Massachusetts Port Authority	\$33,000	\$5,000	\$38,000
Metropolitan Area Planning Council	-	\$5,000	\$ 5,000
Department of Public Works	-	\$5,000	\$ 5,000

Each Agency agrees to commit itself in writing to its respective contribution, and to transfer or credit such amount to a special account to be set up for the purpose of carrying out this study.

It is understood and agreed that no agency shall, without its consent, be liable for more than the amount of its respective contribution hereinabove indicated. An Agency may make or agree to make a contribution in cash or services in excess of the amount hereinbefore set opposite its name, in which event, such increased amount shall thereafter be deemed to be the amount of its contribution for all purposes hereunder.

2. The Agencies, individually and collectively, hereby authorize the Council to make application in their behalf to the Department of Housing and Urban Development (HUD) for an Urban Planning Assistance Grant ("Grant") under Section 701 of the Housing Act of 1954, as amended. The total amount contributed by the Agencies hereunder shall be considered the Local Share applicable to such Grant, and the Council shall be considered

Department of Public Works	-	\$2,000	\$2,000	432,000
Department of Planning Council	-	\$1,000	\$1,000	\$ 5,000
Department of Public Works	-	\$2,000	\$2,000	\$ 5,000

Each Agency agrees to commit itself in writing to the respective contribution, and to transfer or credit such amount to a special account to be set up for the purpose of carrying out this act. It is understood and agreed that no agency shall, without its consent, be liable for more than the amount of its respective contribution hereinafter indicated. No Agency may make or cause to make a contribution in cash or services in excess of the amount indicated and agree to the same, in which event, such increased amount shall thereafter be deemed to be the amount of its contribution for all purposes hereunder.

The agencies, individually and collectively, hereby authorize the Council to make application in their behalf to the Department of Housing and Urban Development (HUD) for an Urban Planning Assistance Grant ("Grant") under Section 101 of the Housing Act of 1954, as amended. The total amount requested by the Agencies hereunder shall be considered the total amount applicable to such Grant, and the Council shall be considered

the Local Planning Agency for purposes of receiving and administering such Grant.

3. Each Agency, upon request of the Executive Director of the Council, shall supply promptly such data, documentation or other material as may be required for the purposes of applying for and/or administering the Grant.
4. The study and plan, which shall be called the "Metropolitan Airport System Study, "shall be initiated immediately upon notification from HUD of approval of the Council's Grant application. The study and plan shall conform to HUD requirements and will be conducted and completed in accordance with, and limited to the study specifications which are attached hereto and made a part hereof.
5. The Executive Director of the Council shall appoint the Study Director, who shall be responsible for the technical and administrative coordination of the overall study. It shall also be the responsibility of the Study Director to assure appropriate coordination by the Agencies and their consultants, to facilitate the exchange of data between the Agencies and their consultants, and to carry out the Council's responsibilities under the study. The collection of data required for each portion of the study shall be the responsibility of the Agency or consultant conducting such portion, but the Study Director shall assist wherever possible in collecting data from other public or private agencies.

6. Each Agency shall designate a member of its staff as the person primarily responsible for carrying out its responsibilities under the study and shall notify the Study Director of such designation promptly in writing.
7. Such consultants as may be necessary to assist an Agency in performing its obligations under this Agreement shall be selected by each such Agency, subject to the approval of the Executive Director of the Council. All consultant contracts shall contain such terms and conditions as are required by the Urban Planning Grant Contract between the Commonwealth, acting by and through the Council, and the United States of America, acting by and through HUD.
8. The Authority, with its consultants and such other assistance as it may require, shall prepare a study which shall be as described in the Future Aviation Potentials and Facility Requirements for the Air Service Area, a copy of which is attached hereto. The Council agrees to reimburse the Authority from the funds received from HUD for the amount paid to the Authority's consultant for services performed in accordance with this paragraph in excess of the Authority's cash contribution as specified in Paragraph 1. The Authority's assumption of the expense of the services of consultants engaged by it shall be construed in accordance with the provisions of this paragraph and the provisions of

Paragraph 7 above. A preliminary study, including at least two alternatives, shall be submitted for review by the Agencies, and the representatives of the Agencies, within 30 days, shall submit to the Study Director their written review and recommendations on such study. The Agencies shall consult with the Massachusetts Aeronautics Commission (Commission), the Department of Commerce and Development (Department) and the District office of the Federal Aviation Agency (FAA) which together with representatives of the Agencies which are a party to this Agreement shall constitute the Advisory Committee and incorporate in the final report any suggestions of the said Advisory Committee as are agreed upon by the Agencies. The final study will then be submitted to the Study Director.

9. This Agreement shall be effective upon the execution hereof by the Agencies agreeing to make the contributions hereinbefore indicated. If for any reason any of the Agencies fail to become parties hereto, this Agreement shall nevertheless become and remain effective in accordance with all its terms except that the party or parties not executing the Agreement shall not be considered as Contributors, and the aggregate amount under Paragraph 1 above, and the amount of the Grant requested, may be correspondingly reduced.
10. Each of the Agencies represents and agrees that it has funds

appropriated, authorized and/or available to make payment of its contribution hereunder.

11. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original.
12. This Agreement shall be binding upon and insure to the benefit of each of the Agencies and its successors.

IN WITNESS WHEREOF, each of the Agencies has caused this Agreement to be executed by its thereunto duly authorized officer or representative as of the day and year first above written.

COMMONWEALTH OF MASSACHUSETTS
METROPOLITAN AREA PLANNING COUNCIL

By /s/ Robert G. Davidson

MASSACHUSETTS PORT AUTHORITY

By /s/ Edward J. King

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

By /s/ Edward J. Ribbs

Boston Public Library

